

Environmental Assessment

For The

Lower McCully Timber Sale

Section 14 T23N R27W

Prepared By

**Dale Peters, Management Forester
Plains Unit, Northwestern Land Office**

Montana Department of Natural Resources and Conservation

February 2014

(this page intentionally left blank)

Table of Contents

Objective Memo	5
Checklist Environmental Assessment	7
Attachment I: Area Maps	15
Attachment II: Resource Analysis	21
• Vegetation Analysis	22
• Watershed and Hydrology Analysis	25
• Soils Analysis	31
• Wildlife Habitat Analysis	36
Attachment III: Harvest Prescriptions	73
Attachment IV: Mitigations	86
Attachment V: Consultants & References	88

(this page intentionally left blank)

MEMORANDUM

To: Dale Peters, Plains Unit Management Forester
From: David Olsen, Plains Unit Resource Program Manager
Date: February 3, 2013
RE: Lower McCully Timber Sale

Primary Objective

The primary objective of the Lower McCully Timber Sale is to generate income for the Public Buildings Trust. The land parcel involved in this project is located in Section 14, Township 23 North, Range 27 West. The project would provide an estimated 2.5 MMBF of merchantable timber applied toward meeting the FY 2014 Northwestern Land Office timber sale volume goal.

Secondary Objective

Minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area.

Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust Land included in this project.

Reduce fire hazard and associated risks of losses to State of Montana, United States Forest Service and privately owned lands in the area.

Management Directives

In planning and preparing this project, management direction of the State Forest Land Management Plan and associated Administrative Rules shall be followed. All applicable Streamside Management Zone rules and regulations will be met. Montana Best Management

(this page intentionally left blank)

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Lower McCully Timber Sale
Proposed Implementation Date:	July, 2014
Proponent:	Plains Unit - Northwestern Land Office Department of Natural Resources and Conservation.
Location:	Section 14, Township 23 North, Range 27 West
County:	Sanders County

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to sell approximately 20,650 tons (2.8 MMBF) of sawlogs from Section 14, T23N, R27W, approximately 20 air miles north of Plains, Montana. This action would produce estimated revenue of \$700,000.00 for the Public Buildings (P.B.) Trust Grant and an additional estimated \$70,000.00 in Forest Improvement (FI) fees.

Under the proposed action, the DNRC harvest activities would:

- maintain and improve forest health,
- reduce fuel loadings and,
- increase forest productivity beneficial to future Trust actions.

The harvest prescriptions are designed to promote timber types historically found in the area, improve forest health and promote regeneration of the project area (See Attachment I, Area Maps and Project Plan; Attachment III, Harvest Prescriptions). If the Action Alternative is selected, activities would begin July 2014.

In addition to timber harvesting, approximately:

- 0.31 miles of new road would be constructed,
- 4.58 miles of existing road would be reconstructed,
- 0.75 miles of existing woods road would be abandoned,
- 0.24 miles of old existing, abandoned roads would be obliterated and,
- 2.39 miles of DNRC – Plum Creek Timber Company (PCTC) road use cooperator agreement road system would have advanced maintenance preformed. (See Attachment I, Area Maps and Project Plan).

Lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889:1972 Montana Constitution, Article 1 Section11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996), the Administrative Rules for Forest Management (ARM 36.11.401 through 71), and conservation commitments contained in the Montana Forested State Trust Lands Habitat Conservation Plan (HCP) as well as other applicable state and federal laws.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

Public involvement has been solicited through newspaper advertisements in the “Missoulian”, the “Sanders County Ledger” and the “Clark Fork Valley Press/Mineral Independent”. Through letters sent to adjacent landowners, as well as other known interested parties and organizations, including Confederated Salish & Kootenai Tribes (CS&KT). Public response was received and used to assist in identifying issues surrounding the proposed project.

Three public comments were received for this project:

1. Mineral County Board of Commissioners; support for the project.
2. CS&KT; asks to be notified should any cultural sites be discovered.
3. Paul Harvey, Sanders County resident; concern over road closures and hunting access.

Hydrological, soils, wildlife, archaeological, and vegetative concerns were identified by DNRC specialists and field foresters for both the No-Action and the Action Alternatives. Issues and concerns have been resolved or mitigated through project design and/or would be included as specific contractual requirements of the project. Recommendations to minimize direct, indirect, and cumulative impacts have been incorporated in the project design (see Attachment I, Area Maps and Project Plan; Attachment II, Resource Analyses; Attachment III, Harvest Prescriptions; Attachment IV, Mitigations; Attachment V, Consultants and References).

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

Montana Department of Environmental Quality (DEQ)

DNRC is classified as a major open burner by the Montana Department of Environmental Quality (DEQ), and is issued a permit from the DEQ to conduct burning activities on State lands managed by the DNRC. As a major open burning permit holder, DNRC agrees to comply with all of the limitations and conditions of the permit.

Montana/Idaho Airshed Group

DNRC is a member of the Montana/Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning, related to forest management activities done by DNRC. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, MT.

Incidental Take Permit – U.S. Fish and Wildlife Service

In December 2011, the U.S. Fish and Wildlife Service issued DNRC an Incidental Take Permit under Section 10 of the Endangered Species Act. The Permit applies to select forest management activities affecting the habitat of grizzly bear, Canada lynx, and three fish species — bull trout, westslope cutthroat trout, and Columbia redband trout — on project area lands covered under the HCP. DNRC and the USFWS will coordinate monitoring of certain aspects of the conservation commitments to ensure program compliance with the HCP.

3. ALTERNATIVE DEVELOPMENT:

Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.

Action: The Action Alternative is described in Section 1, Type and Purpose of Action. No other action alternatives were identified during project scoping or analysis; therefore only forest product removal and sale are analyzed in the EA Checklist. Recommended actions to reduce environmental effects would be incorporated into the proposed action.

No Action: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. The No Action alternative would result in decreased growth rates, continued decline of stand conditions and increased fuel loading within the timber stands. This alternative would not produce revenue for the Public Buildings (P.B.) Trust Grant or the Forest Improvement account.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" if no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.

A DNRC hydrologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated into the project design. (See Attachment II, Resource Analysis; Soils, Watershed and Hydrology Analysis).

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design (See: Attachment II, Resource Analyses; Attachment IV, Mitigations).

6. AIR QUALITY:

What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

The proposed project is located in the Montana State Airshed 2 as designed by the Montana/Idaho Airshed Group.

Pile burning would introduce particulate matter into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations. Thus direct, indirect, and cumulative effects to air quality are expected to be minimal.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.

Tree removal would cause changes in the vegetative structure of the project area. Silvicultural prescriptions have been developed to keep stands moving towards desired future conditions, while maintaining good tree growth and vigor. Harvest prescriptions also aim to remove diseased and insect infested timber. No old growth stands as defined by Green et al. (1992) are present in the project area; therefore the action alternative would not affect old growth. No sensitive plants listed by the Montana Natural Heritage Program have been identified in the project area. Measures to minimize noxious weeds, insects and disease are included in the project design (See Attachment IV, Mitigations). The proposed action alternative would promote the continued development of the desired future cover types of ponderosa pine, western larch/Douglas-fir, lodgepole pine and Douglas-fir.

Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment I, Area Maps and Project Plan: Attachment II, Resource Analysis, Vegetation Analysis, Attachment III, Harvest Prescriptions; Attachment IV, Mitigations).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Habitat Analysis, Watershed and Hydrology Analysis: Attachment III, Harvest Prescriptions: Attachment IV, Mitigations).

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Habitat Analysis: Attachment III, Harvest Prescriptions: Attachment IV, Mitigations).

10. HISTORICAL AND ARCHAEOLOGICAL SITES: *Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.*

The CS&KT has reviewed the DNRC's proposed harvest of the Lower McCully timber sale. No known cultural sites would be impacted by the undertaking. This is documented by a letter from the Tribal Heritage Preservation Office, dated 4/8/13.

The DNRC has no record of cultural resources within the project's area of potential effect. However, a professional inventory of cultural resources has not been conducted. If previously unknown, cultural or paleontological materials are identified during project related activities, all work will cease until the DNRC Archaeologist is contacted to assess the resource and plan appropriate treatment if needed.

Based on the above information and mitigations no direct, indirect, or cumulative impacts would occur under the action alternative.

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify direct, indirect, and cumulative effects to aesthetics.

Topography is rolling terrain, foothills of the mountains; therefore the majority of the sale area would be hidden from view minimizing visual impacts. Portions of the project would be visible from the Thompson River County road that passes through the southeast quarter of this parcel.

Openings or disturbance from harvest operations, with overstory ponderosa pine, western larch and Douglas-fir retained throughout most of the project area would likely be visible upon completion of the project. Prescriptions are designed to mimic historic stand conditions, surrounding land management practices and would not have long term adverse visual impact on the area (see: Attachment III, Harvest Prescriptions; Attachment IV, Mitigations).

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify direct, indirect, and cumulative effects to environmental resources.

No direct, indirect, or cumulative impacts would likely occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

EA's known:

Big Prairie TS 2005
West Prairie Salvage 2010
Thompson Face TS 2012

IV. IMPACTS ON THE HUMAN POPULATION

- | |
|--|
| <ul style="list-style-type: none">• <i>RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.</i>• <i>Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.</i>• <i>Enter "NONE" if no impacts are identified or the resource is not present.</i> |
|--|
-

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

Human health would not be impacted by the proposed timber sale or associated activity. There are no unusual safety considerations associated with the proposed timber sale. Therefore there would be no direct, indirect, or cumulative impacts from this proposed action.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

Timber harvest would provide continuing industrial production in Sanders County.

Due to the relatively small size of the timber sale, there would be no measurable direct, indirect, or cumulative impacts from this proposed action on industrial production.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.

The Montana Bureau of Business and Economic Research estimates that about 10 jobs are supported for one year for every 1 MMBF that is harvested. For this project, that equates to about 38 jobs for one year.

However due to the relatively small size of the timber sale and the short duration, there would be no measurable direct, indirect, or cumulative impacts from this proposed action on the employment market.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and cumulative effects to taxes and revenue.

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable direct, indirect, or cumulative impacts from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify direct, indirect, and cumulative effects of this and other projects on government services

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on the designated haul route. (See attachment I: Area Maps). This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source. No changes to the level of government services would be needed as a result of this project, therefore it would not contribute to direct, indirect or cumulative effects on government services.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: *List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

PCTC – Plains Unit road use agreement. Plum Creek Timber Company and the MT DNRC Plains-Unit are local cooperators on area roads that access PCTC & MT DNRC lands.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.

Recreational areas and wilderness are not accessed through this tract.

The current road closures are ineffective. Roads through this area that would be closed only access the immediate area. There would be a net increase of closed roads, benefiting wildlife security and limiting resource damage.

Although this area is hunted frequently, closure of them would not affect the ability of people to recreate on these parcels as the County Road would still be open to the public.

Illegal off road vehicle use is expected to decrease while legal use is expected to remain the same with the Action Alternative.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify direct, indirect, and cumulative effects to population and housing.

There would be no measurable direct, indirect, or cumulative impacts related to population and housing due to the relatively small size of the timber sale, and the fact that people are already employed in this occupation in the region.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No direct, indirect, and cumulative impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY: *How would the action affect any unique quality of the area?*

No direct, indirect, and cumulative impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. Stumpage value is based on comparable sales analysis of similar recent timber sales. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for the timber. The proposed action alternative would produce an estimated return to Public Buildings (P.B.) Trust Grant of \$700,000.00 and \$70,000.00 in Forest Improvement (FI) fees. The No Action Alternative does not generate any return to the trust at this time.

EA Checklist Prepared By:	Name: Dale Peters	Date: 2/2014
	Title: Management Forester	

V. FINDING

25. ALTERNATIVE SELECTED:

The interdisciplinary has completed the Environmental Assessment for the Lower McCully Timber Sale. In the development of this EA two alternatives were considered, Action and No Action. These two alternatives were evaluated on their ability to: 1) Increase the vigor and health of the stand by limiting the effects of insects, disease and reducing the stocking level; 2) Generate revenue for the Public buildings Trust Fund and 3) Increase forest productivity beneficial to future actions.

After a thorough review of the EA, project file, public correspondence, Department policies, standards and guidelines, I have selected the Action Alternative for the implementation on this project.

I have selected the Action Alternative for implementation with the understanding that resource mitigation measures identified in the Environmental Assessment will be applied to meet the intended protection. The Action Alternative has been selected for the following reasons:

- 1) The Action Alternative meets the Purpose of Action and the specific project objectives listed on page 5 of the EA.
- 2) DNRC is required to administer these lands to produce the largest measure of reasonable and legitimate long-term return for beneficiaries (*Montana Codes Annotated 77-1-202*). DNRC meets this long term obligation by managing intensely for healthy and biologically diverse forests.
- 3) The Action Alternative includes the necessary mitigations and a consensus of professional opinion on limits of acceptable environmental impact.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

I find that none of the project impacts are regarded as severe, enduring, geographically widespread, or frequent. Further, I find that the quantity and quality of the natural resources, including any that may be considered unique or fragile, will not be adversely affected to significant degree. I find no precedent for future actions that would cause significant impacts, and I find no conflict with local, State, or Federal laws, requirements, or formal plans. In summary, I find that adverse impacts will be avoided, controlled, or mitigated by the design of the project to an extent that they are not significant.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

☐

EIS

☐

More Detailed EA

☒

No Further Analysis

EA Checklist Approved By:	Name: David M. Olsen
	Title: Plains Unit Manager
Signature:	<i>David M. Olsen</i>
	Date: 2/25/2014

Attachment I

Area Maps and Project Plan

Vicinity Map	16
Haul Route Map	17
Harvest Plan Map	18
Current Cover Types Map	19
Future Desired Conditions Map	20

49°00'N

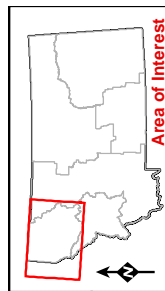
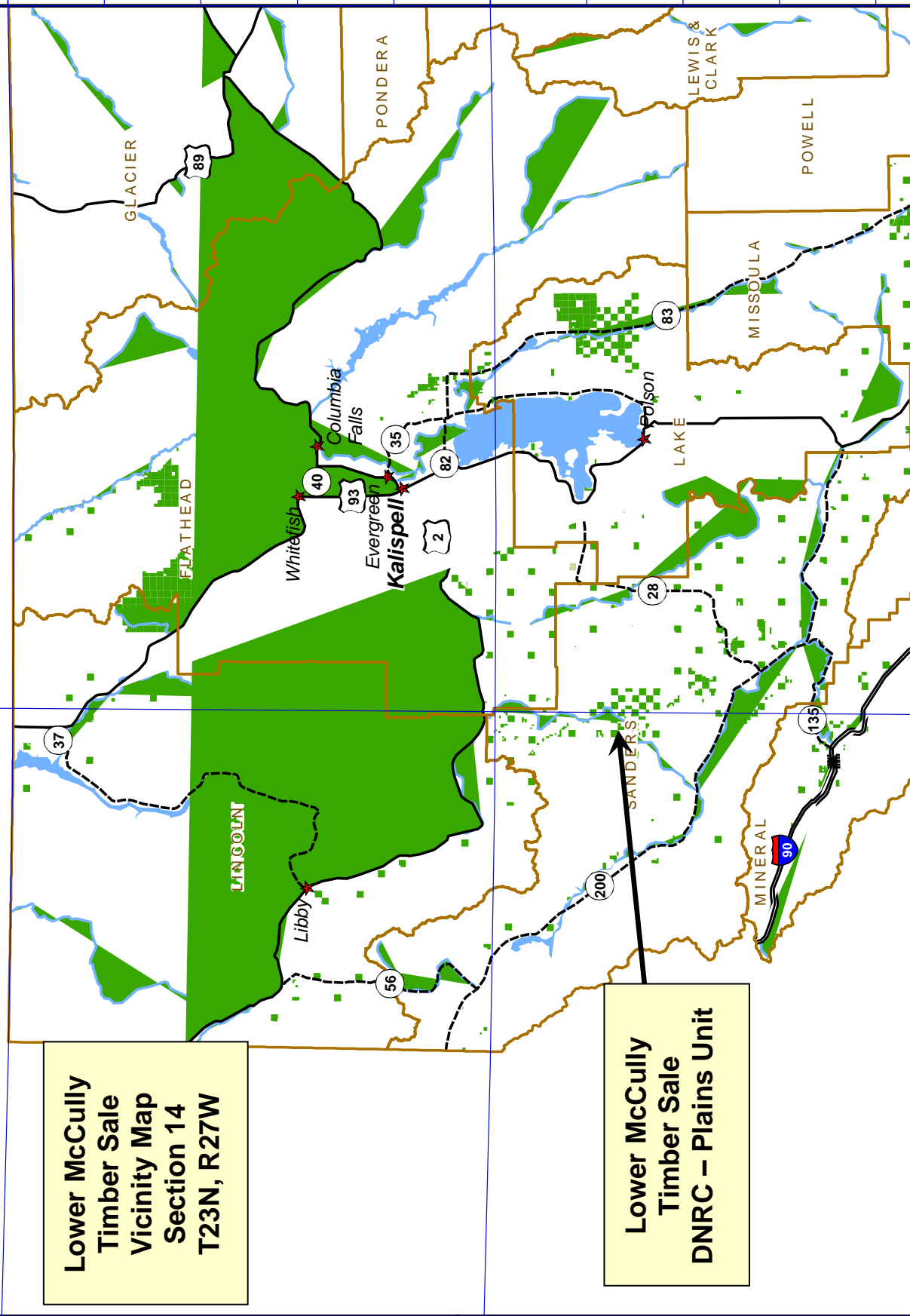
48°00'N

115°00'W

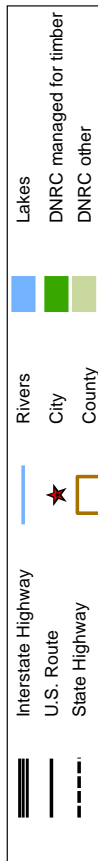
115°00'W

Lower McCully
Timber Sale
Vicinity Map
Section 14
T23N, R27W

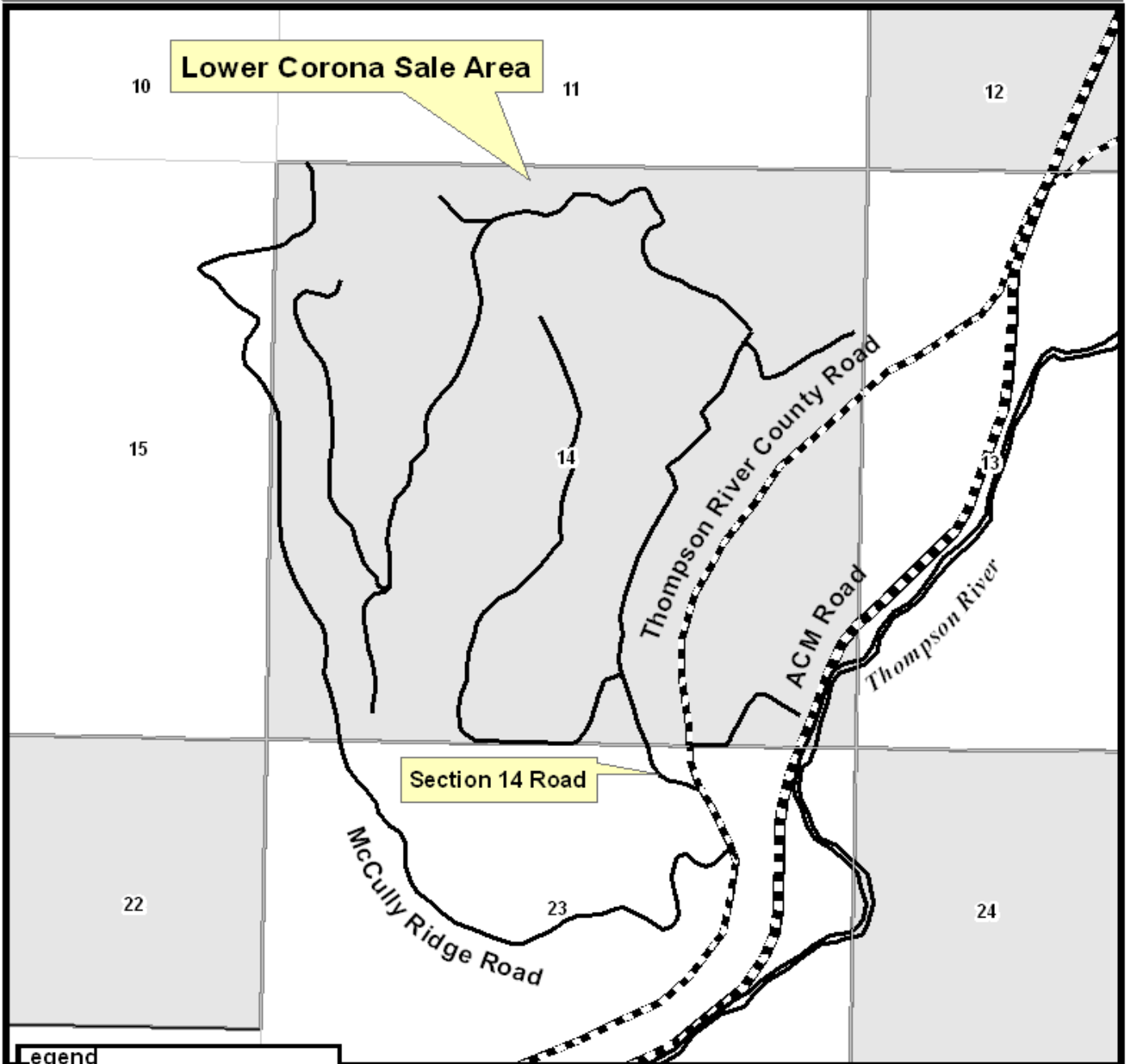
Lower McCully
Timber Sale
DNRC – Plains Unit



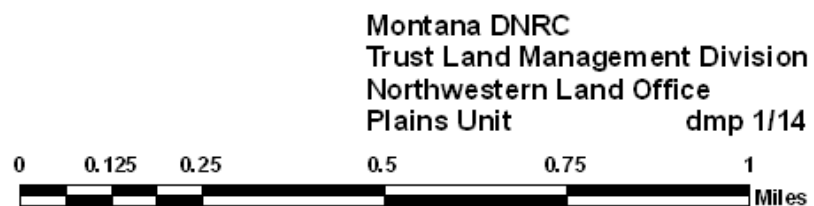
21 February 2007
Montana DNRC
Technical Services Section/dr



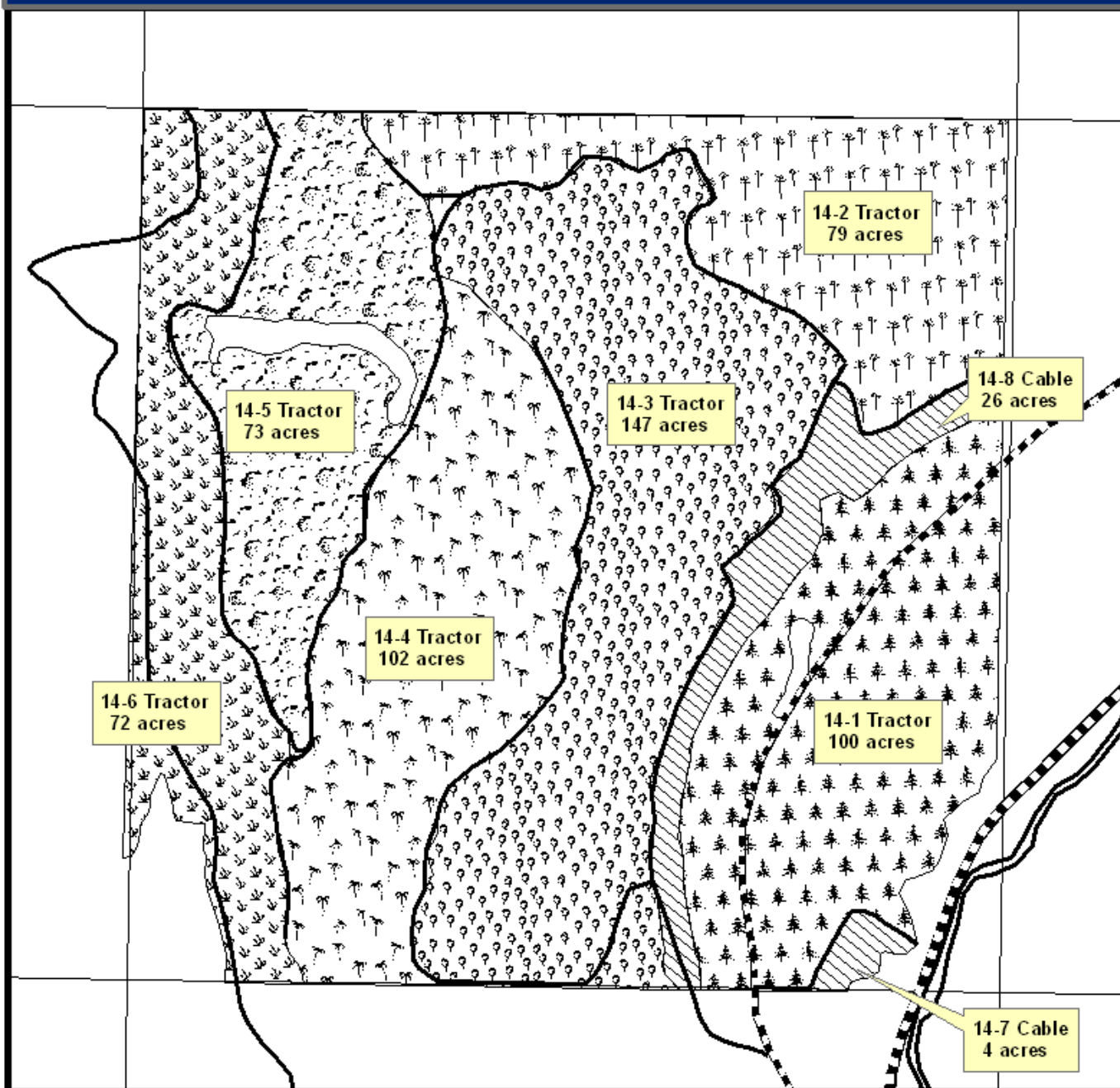
Haul Route; Lower McCully Timber Sale T23N R27W S14



Legend	
	Proposed Haul Route
	County Road
	ACM Road
	Thompson River
	Ownership Trust Lands



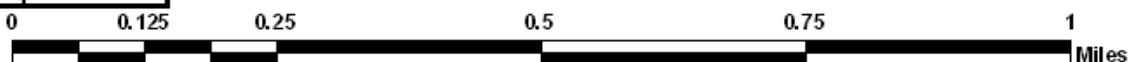
Proposed; Lower McCully Harvest Plan T23N R27W S14



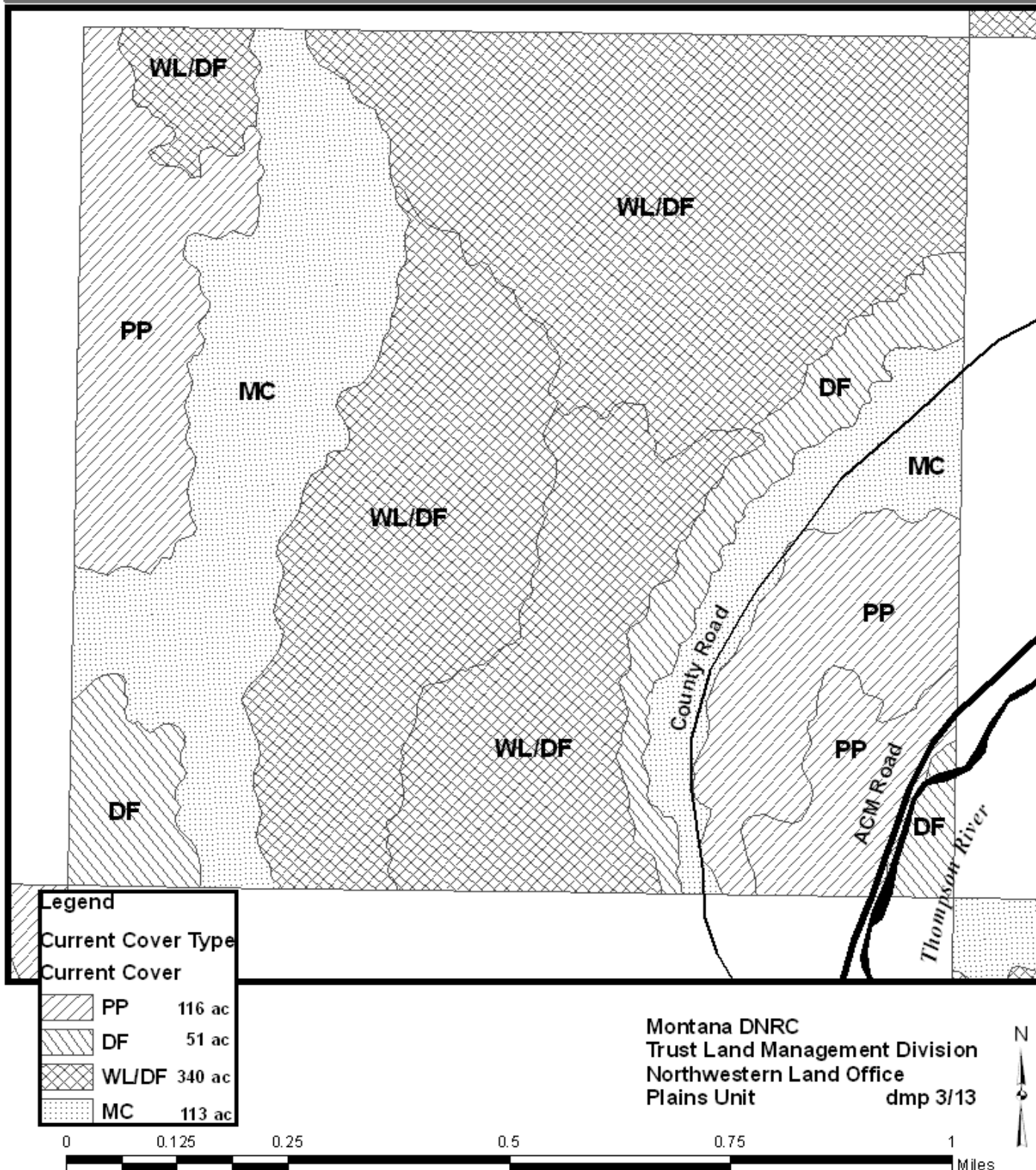
Legend

- County Road
- ACM Road
- Thompson River

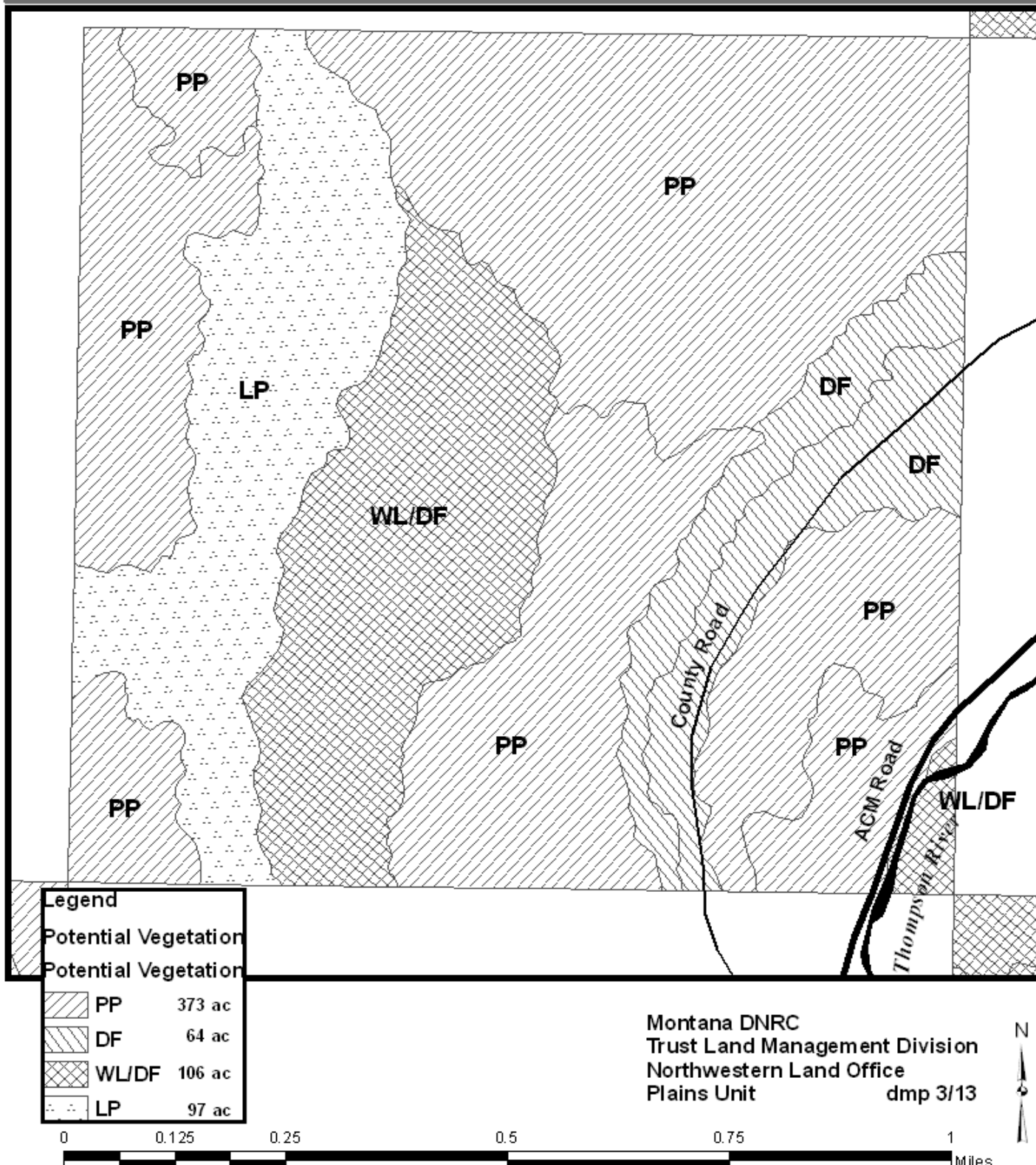
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 1/14



Current Cover Types; Lower McCully TS T23N R27W S14



Desired Future Conditions; Lower McCully TS T23N R27W S14



Attachment II

Resource Analysis

Vegetation Analysis	22
Watershed and Hydrology Analysis	25
Soils Analysis	31
Wildlife Habitat Analysis	36

Footnote: All proposed road miles, harvest boundaries and acreages are close approximations as this proposal has not yet been implemented on the ground.

Vegetation Analysis

Introduction

This analysis is designed to disclose the existing condition of the vegetative resource and display the anticipated effects that may result from each alternative. During the initial scoping, issues were expressed by the public and internally regarding vegetative conditions. The following concerns were expressed regarding proposed timber harvesting and related activities on vegetation:

- Improve forest health. Minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area.
- Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust Land included in this project.
- Reduce fire hazard and associated risks of loss to State of Montana.
- Concern regarding the impacts to threatened and endangered plants.

Analysis Area

The analysis area for direct and indirect effects is state section 14 of T23N R27W. This section is located 20 air miles north of Plains, Montana, at the toe of McCully Ridge. Cumulative impacts are considered at the scale of the Plains Unit and will adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts.

Analysis Method

The Plains Unit typically prepares two to four timber sales per year. Each proposed project is evaluated for its potential effects on lands managed by the DNRC and the surrounding landscape. Methods used in the analysis included review of stand level inventory (SLI) data, field visits, review of scientific literature, aerial photography, and consultation with other professionals.

Existing Condition

Past and current events have changed the forest conditions on the proposed parcels involved in the project area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since the early 1900's, fire has been virtually eliminated from the project area.

Logging activity has occurred in the past on this section. The earliest section records reveal that 8.97mmbf (6.83mmbf DF/WL and 2.14mmbf PP) was harvested between the years 1948-52, as evidenced by the large diameter stumps that still exist.

Christmas tree permits were issued through the years of 1949 – 1968, totaling 2,860 bales of trees. This action has had an effect on the advanced regeneration of this section.

Small saw log and pulp removal permits were issued from 1965 – 1989.

25.4mbf (22.15mbf WL, 3.25mbf DF) was harvested in 1965.

7.1mbf (4.7mbf WL/DF, 2.3mbf PP) was harvested in 1969.

4.0mbf (2.7mbf DF, 1.3mbf PP) was harvested in 1970.

30mbf of "Dry" was harvested in 1972. (This is assumed to be dead LPP).

1,747mbf (145.3mbf WL, 1,264.2mbf DF, 88.6mbf PP, 82.2mbf GF, 159.1mbf LPP, 7.6mbf "Dry") was harvested between the years 1971 – 1972.

30mbf of "Dry" was harvested in 1974.

67.6mbf (8.8mbf PP, 58.9mbf LPP) and 605.86 tons of pulp was harvested in 1989.

This totals approximately 11mmbf from 1948 – 2014, along with small amounts of posts, poles, Christmas trees, boughs and firewood collected through the years.

This selective logging of the dominant and co-dominant timber, the need for an aggressive thinning program, and lack of low-intensity wildfires has resulted in the development of multi storied stands

dominated by Douglas-fir of poor form class and a thicket of GF & DF advanced regeneration. Standing wildlife snags are scarce due to the easy access to this section for firewood gatherers.

Table V-1: Current cover types and desired future conditions for section 14 T23N R27W.

Cover Type Section 14	Current Acres	DFC Acres	Current minus (-) DFC*
ponderosa pine	116	373	-257
western larch/Douglas-fir	340	106	+234
Douglas-fir	51	64	-13
mixed conifer	133	0	+113
lodgepole pine	0	97	-97
Totals	640	640	
*A positive value indicates excess current acreage compared to DFC, and a negative value indicates a deficiency in acreage compared to DFC.			

As shown in Table V-1, Western larch/Douglas-fir and mixed conifer cover types are currently over-represented in section 12. Ponderosa pine and lodgepole pine cover types are deficient.

Direct and Indirect Effects

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant grand fir continuing to thrive in the understory. Within the next 50 - 100 years this species may replace the current overstory. Growth and vigor of trees present in the analysis area would continue to decline as competition increases.

Action Alternative

The proposed action alternative would harvest timber on approximately 604 acres. The proposed harvest would be focused on opening the stand to enhance regeneration of preferred seral species, reducing stocking of shade tolerant climax species. More detailed information for treatment of individual units can be found in Attachment III, Harvest Prescriptions. Gated road closures and obliteration of off-road access points would prevent the unauthorized removal of snags and snag recruits. Fuel loadings would be reduced by removal of ladder fuels from the understory and intermediate components of the stand, as well as opened crown spacing in the overstory component. Growth and vigor of the remaining trees is expected to increase as residual tree spacing would allow full light to crowns and more available water. Noxious weeds would be monitored and addressed through the Plains Unit integrated weed management program.

Table V-2: Current cover types, desired future conditions, and anticipated post-harvest type distribution for section 14 T23N R27W.

Cover Type Section 14	Current Acres	DFC Acres	Anticipated Post Harvest Acres	Change in Acreage*
ponderosa pine	116	373	146	+30
western larch/Douglas-fir	340	106	408	+68
Douglas-fir	51	64	81	+30
mixed conifer	133	0	5	-128
lodgepole pine	0	97	0	0
Totals	640	640	640	
*A positive value indicates an increase of post harvest acreage compared to current acres, and a negative value indicates a decrease in acreage compared to current acres.				

As shown in Table V-2, there would be a shift towards the desired future condition of ponderosa pine cover types while reducing the acres of the mixed conifer cover types represented in this section.

Post harvest acres of the ponderosa pine, western larch/Douglas-fir, lodgepole pine cover types do not reflect much movement towards the DFC. It should be noted that it will take several harvest entries to modify these stands of timber to emulate the DFC. This harvest entry would move these stands towards the DFC while maintaining productivity of residual timber and take advantage of the existing advanced regeneration that currently exists on site.

Cumulative Effects

No Action Alternative

Under this alternative, stand structure and species composition on state land across the Plains Unit will move towards a shade tolerant, climax condition. Fuel loadings are expected to increase due to tree mortality from insects and disease outbreaks.

Action Alternative

Across the Plains Unit there would be a slight shift towards Desired Future Conditions as the proposed treatment would alter the Current Vegetation Cover Types. This change would occur on approximately 128 acres. The Plains Unit has 53,151 Classified Forest acres. This results in a change of less than 1% of the total Classified Forest acres. The project area would be altered with regard to size class distribution and stocking levels. Fuel loading, ladder fuels, insect and disease incidence would be reduced.

LOWER McCULLY TIMBER SALE PROPOSAL WATER RESOURCES ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and describe the anticipated effects that may result from each alternative of this proposal. During the initial scoping, no issues were identified regarding water-quality, water-quantity, or fisheries resources from the public. Internally within DNRC, issue statements were developed to measure application of Forest Management Rule criteria. The following issue statements were compiled from internal discussions regarding the effects of the proposed timber harvesting:

- *Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.*
- *Cumulative effects from timber harvest may affect channel stability by increasing annual water yields.*

These issues will be addressed by addressing by assessing the risk of sediment delivery to water bodies from roads and harvest units; assessing the risk of destabilizing channels from annual water yield increases.

The *ENVIRONMENTAL EFFECTS* sections disclose the anticipated direct, indirect, and cumulative effects to water resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships in each analysis area have been taken into account for the cumulative effects analysis.

Issues Dismissed

Potential impacts to fisheries are dismissed from further analysis due to the limited extent of fish-bearing streams in the project area and other potentially affected fisheries resources outside of the project area. While the Thompson River contains several species of fish, no activities are proposed within 140 feet of the Thompson River and no stream channels within the harvest units connect via surface flow to the Thompson River; no impacts to stream shading, stream temperature or wood y debris recruitment are expected to occur. Potential impacts to fisheries habitats due to sediment delivery from the haul route within and outside the project area are not expected to occur. Potential impacts to fisheries habitats due to changes in flow regimes are also not expected to occur. No measureable or detectable impacts to fisheries resources would be expected from either the No Action or Action Alternative.

ANALYSIS METHOD

Sediment Delivery

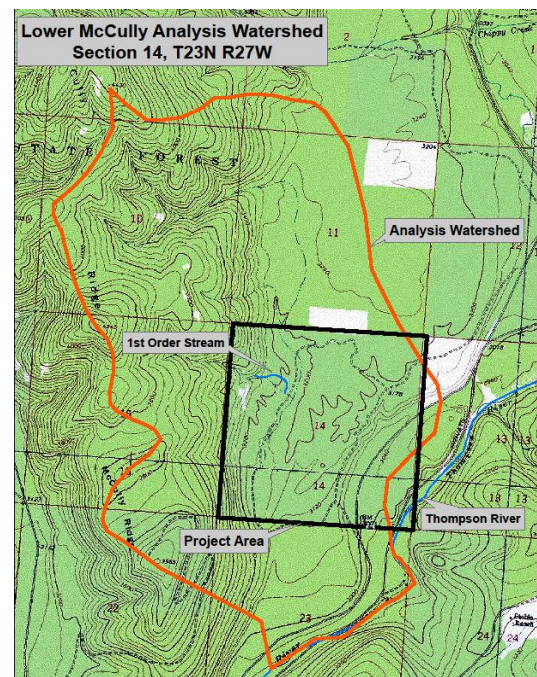
The methods applied to the project area to evaluate potential direct, indirect, and cumulative effects include a field review of potential sediment sources from haul routes within and outside the parcel until connected to a county maintained road. Roads were evaluated to determine existing sources of introduced sediment from existing and proposed roads.

Potential sediment delivery from harvest units will be evaluated from a risk assessment. This risk assessment will use the soil information provided in the *SOILS ANALYSIS* and the results from soil monitoring on past DNRC timber sales.

Water Yield

Impacts from increases in annual water yield will be discussed qualitatively in this document. The discontinuous and intermittent characteristic of streams within proposed harvest units in the project area diminishes the potential impacts. Visual inspection of runoff patterns and stream channel stability in the project area along with aerial photo

Figure H-1: Analysis Watershed



interpretation will be used to determine the impacts and extent of past management in the analysis area.

ANALYSIS AREA

Sediment Delivery

The analysis area for sediment delivery is the proposed harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project. In addition, in-channel sources of sediment such as mass-wasting locations or excessive scour/deposition will be disclosed if found in project area streams.

Water Yield

The analysis area for annual water yield will include the first order stream in the middle of the state parcel (**Figure 1**) project area. This stream does not connect via surface flow to the Thompson River, but will effectively display the potential impacts of proposed activities from annual water yield increases.

WATER USES AND REGULATORY FRAMEWORK

WATER QUALITY STANDARDS

This portion of the Clark Fork River basin, including the Thompson River and its tributaries, is classified as B-1 by the DEQ, as stated in the ARM 17.30.607(a). Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases over natural turbidity. "Naturally occurring," as defined by ARM 17.30.602 (19), includes conditions or materials present during runoff from developed land where all reasonable land, soil, and water conservation practices (commonly called Best Management Practices or BMPs) have been applied. The State of Montana has adopted BMPs through its non-point source management plan (MDEQ, 2007) as the principle means of meeting the Water Quality Standards. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that could create impacts.

WATER QUALITY LIMITED WATERBODIES

None of the streams in the project area are considered impaired waterbodies and listed on the 2012 303(d) list (MDEQ 2012).

STREAMSIDE MANAGEMENT ZONE LAW (SMZ)

All rules and regulations pertaining to the SMZ Law are to be followed. An SMZ width of 100 feet is required on Class 1 and 2 streams and lakes when the slope is greater than 35 percent. An SMZ width of 50 feet is required for Class 1 and 2 streams when the slope is less than 35 percent and for all Class 3 streams.

FOREST MANAGEMENT RULES AND HABITAT CONSERVATION PLAN (HCP)

In 2003, DNRC drafted Administrative Rules for Forest Management. The portion of those rules applicable to watershed and hydrology resources include ARM 36.11.422 through 426 and 470 through 471. The HCP was adopted in December 2011 and all conservation commitments covered by the HCP are also to be applied to this project. All applicable rules will be implemented if they are relevant to activities proposed with this project.

WATER RIGHTS

Surface water rights are present on and downstream of the state parcel for stock watering, industrial uses and fire protection.

EXISTING CONDITION

GENERAL DESCRIPTION

The project area has two streams identified with the state parcel boundary. The first stream is located in the middle of the section; it is discontinuous and intermittent stream and does not contribute surface flow to any other body of water. No unstable areas or sediment sources were identified on this stream. Bankfull width is approximately 15 inches. No fish are present in this stream.

The second stream in the parcel is the Thompson River that cuts across the southeast corner of the parcel. This is a perennial, tributary to the Clark Fork River near Thompson Falls, Montana. This reach of the Thompson River is considered to be a “B” stream type (Rosgen 1996; DNRC 2000). Characteristics of a “B” channel include low channel erosion, relatively low channel sinuosity (meandering) and moderate entrenchment. No unstable banks were noted near the state parcel during field reconnaissance. According to the MDEQ assessment record for this stream, the road immediately adjacent to the river is “*not a contributor of sediment to the stream*” (MDEQ 2012a). Bankfull width through the state parcel is approximately 70 feet. Fish present in this reach include brook trout, westslope cutthroat trout, brown trout and bull trout and others. This portion of the Thompson River is also considered bull trout nodal habitat by MFISH. Nodal habitat is a migration corridor or overwintering area.

SEDIMENT DELIVERY

A field review of the haul route during May and July 2013 found no evidence of sediment delivery to streams from roads. No stream crossings exist within the state parcel or on the haul route outside the state parcel except on county maintained roads. Although the risk of sediment delivery to streams is unlikely, existing roads on the state parcel should have road drainage improvements implemented to avoid rilling on existing road surfaces.

The erosion risk for landtypes in the project area with proposed timber harvest proposed is low to moderate. No mass wasting sites or unstable soils were observed in any of the proposed harvest areas.

WATER YIELD

A review of the harvest history for the project area watersheds was conducted for this project using aerial photos and section record cards. Additionally, a field review of stream channels was completed in May 2013.

A list of harvesting in the project area can be found in the project file. Records show evidence of harvest dating as early as the 1940’s and continuing through 1989. Two major timber harvests occurred on the section; one from 1948 to 1952, and another in 1971-72. Other forest product removals include fence posts and rails, firewood, and commercial/individual Christmas tree harvest.

No water yield impacts were identified from past activities in and around this portion of the Thompson River drainage. Following field reconnaissance of the parcel, it was determined that a detailed water yield analysis would not be necessary for this project. The small stream in the middle of the parcel becomes subsurface and does not contribute to other streams or bodies of water. Both stream channels identified within the proposed project area were stable and showing no signs of impacts from water yield increases. As a result, annual water yield increases resulting from past activities have not been sufficient to destabilize the channels. After evaluating the watershed cumulative effects risks along with the current conditions in the parcel, by ARM 36.11.423, a detailed watershed analysis is not needed for this project.

ENVIRONMENTAL EFFECTS

DESCRIPTION OF ALTERNATIVES

- *No-Action Alternative*

No timber harvesting or associated activities would occur under this alternative.

- *Action Alternative*

Units totaling approximately 604 acres would be commercially harvested under this alternative. All of the proposed harvest would be a shelterwood harvest that would maintain approximately 10 to 20 overstory trees per acre. Advanced regeneration remaining after harvest operations would vary by unit and site specific location. Harvesting would be conducted using conventional ground-based

equipment on approximately 574 acres; approximately 30 acres would require skyline cable yarding. Approximate miles of road activities include:

- 0.31 miles of new construction
- 4.58 miles of reconstruction
- 0.75 miles of old woods road would be abandoned,
- 0.24 miles of old access roads would be obliterated and,
- 2.39 miles would be maintained or have drainage improvements installed as necessary to protect water quality.

Existing activities such as recreational use, individual Christmas tree harvesting and firewood gathering would continue.

DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Water Resources***

Sediment Delivery

Under this alternative, no timber harvesting or related activities would occur. No road drainage improvements would be installed to reduce the risk of rilling or rutting on existing roads, however due to the lack of waterbodies and stream crossings, sediment delivery would be unlikely.

Water Yield

No increased risk of increases or reductions in annual water yield would result from this alternative.

- ***Direct and Indirect Effects of the Action Alternative to Water Resources***

Sediment Delivery

Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion were found (*DNRC 2011*). These sites were harvested during the summer period, and the erosion was attributed to inadequate skid-trail drainage. Displacement was limited to main skid trails that occupy less than 2% of the harvest units." (*DNRC 2011*). By minimizing displacement, less erosion would likely occur compared to other harvest methods with more extensive disturbance (*DNRC 2011*).

During a review of BMP effectiveness, including stream buffer effectiveness, *Raskin et. al. 2006* found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment to the stream. Their findings indicated that the main reasons stream buffers are effective include 1) keeping active erosion sites away from the stream, and 2) stream buffers may intercept and filter runoff from upland sites as long as the runoff is not concentrated in gullies or similar features (*Raskin et. al. 2006*).

Because no harvesting is proposed within 140 feet of the Thompson River or within 50 feet of the stream in the middle of the parcel, the risk of sediment delivery to waterbodies from harvesting activities would be very low.

Existing roads would have minor drainage improvements and BMP upgrades implemented under this alternative to reduce the risk of rilling and rutting. Minor drainage improvements include reshaping drain dips and cleaning ditches, however due to the lack of waterbodies and stream crossings, sediment delivery would be unlikely.

Because DNRC would incorporate BMPs into the project design as required by *ARM 36.11.422 (2)* and all laws pertaining to SMZs would be followed, a low risk of sediment from timber-harvesting activities would result from the implementation of this alternative. Therefore, the risk of long-term adverse direct or indirect effects to water quality or beneficial uses due to increased sediment would be very low.

Water Yield

Approximately 604 acres would be harvested with a regeneration harvest (shelterwood). The reduction in vegetation would not be expected to result in a measureable increase to annual water yield or destabilize channels and measurably increase erosion for the following reasons:

- 1) The well-drained to excessively well-drained nature of the soils would absorb additional available moisture and not produce increased surface runoff, and would in turn produce little or no detectable change in water yield from upland sites,
- 2) Flows in the Thompson River have not shown increased lateral or vertical erosion that could be attributed to increased flows, and
- 3) The small stream in the middle of the parcel is stable with vegetated banks of grasses, forbs and shrubs, making them less prone to destabilization.

Therefore the risk of adverse impacts from annual water yield increases would be low.

CUMULATIVE EFFECTS

- ***Cumulative Effects of the No-Action Alternative to Water Resources***

Sediment Delivery

No additional cumulative impacts from sediment delivery would be expected.

Water Yield

No increase in water yield would be associated with this alternative. No measureable changes to annual water yield or stream channel impacts would be expected.

Cumulative Effects Summary - No-Action Alternative

Because no timber harvesting or associated activities would occur under this alternative, cumulative effects would be limited to the existing conditions.

Cumulative Effects of the Action Alternative to Water Resources

Sediment Delivery

Under this alternative, the proposed timber-harvesting and road-construction activities would occur. A measurable cumulative increase in sediment delivery as a result of timber harvesting and roadwork would not be expected to result because of the lack of streams, landtypes in the project area and road drainage improvements.

Water Yield

Adverse cumulative impacts to stream channels in project area from cumulative annual water yield increases would have a very low risk of occurring because of the well-drained to excessively well-drained nature of the soils and the existing stability of stream channels.

- ***Cumulative Effects Summary – Action Alternative***

Because all timber-harvesting activities would follow BMPs as required by *ARM 36.11.422* and the direct and indirect effects would have a very low risk of impacts, a very low risk of additional adverse cumulative effects would be expected to occur under this alternative.

REFERENCES:

- DNRC 2011. DNRC update to the Compiled Monitoring Report. Includes data from 1988 through 2011. Unpublished. Prepared by J. Schmalenberg, Forest Management Bureau, Missoula, MT.
- Edward B. Raskin, Casey J. Clishe, Andrew T. Loch, Johanna M. Bell. 2006. Effectiveness of Timber harvest Practices for Controlling Sediment Related Water Quality Impacts. *Journal of the American Water Resources Association* 42 (5), 1307–1327.
- MDEQ, 2007. Montana Nonpoint Source Management Plan. Montana Department of Environmental Quality, Water Quality Planning Bureau, Watershed Protection Section. Helena, MT. 136 pages.

MDEQ 2012. Montana Dept. of Environmental Quality. 2012. Montana 2012 Final Water Quality Integrated Report. Helena, MT: Montana Dept. of Environmental Quality.

MDEQ, 2012a. Clean Water Act Information Center (<http://cwaic.mt.gov/>), Montana Water Quality Assessment Database. Assessment Record MT76N004_010.

MRIS. Montana Fisheries Information System. Fisheries database managed by Montana Fish, Wildlife and Parks, Information Services Division, Helena, MT. <http://fwp.mt.gov/fishing/mfish/>

USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.

LOWER McCULLY TIMBER SALE PROPOSAL SOILS ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the soil resources and present the anticipated effects that may result from each alternative of this proposal. During the public scoping, no issues regarding soil impacts were identified by the public. Internally within DNRC, issue statements were developed to measure application of Forest Management Rule criteria. The following issue statements were compiled from internal discussions regarding the effects of the proposed timber harvesting:

- *Ground based harvest techniques can displace and compact soils which can adversely affect the hydrologic function, soil structure and long-term productivity of the impacted area.*
- *Removal of both coarse and fine woody material off site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.*

The project area for this proposal includes approximately 640 acres. Because harvesting is proposed on just a portion of the project area, the analysis area will be smaller.

REGULATORY DOCUMENTS and PAST FOREST MANAGEMENT

The project area is covered by the Forest Management Rules section of the Administrative Rules of Montana. The Forest Management Rules were generally derived from recommendations in the State Forest Land Management Plan (DNRC 1996). In addition, part of the project area is included in the recent Habitat Conservation Plan adopted by the Montana Board of Land Commissioners.

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area, as noted in the SFLMP (DNRC, 1996). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvesting should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments, as feasible, based on site-specific evaluation and plans.

Cumulative effects from past and current forest management in the proposed harvest units are as a result of skid trails and landings. Records show evidence of harvest dating as early as the 1940's and continuing through 1989. Two major timber harvests occurred on the section; one from 1948 to 1952, and another in 1971-72. Impact from skid trails and landings from this time period have been reduced through freeze-thaw cycles and root mass penetrating the soil. While many of the impacts have ameliorated over time, a skid trails are still visible in the proposed harvest units. These skid trails do not appear to be eroding more than the surrounding un-trailed areas, but reduced tree vigor is present on these areas. A list of harvesting in the project area can be found in the project file. Other forest product removals include fence posts and rails, firewood, and individual and commercial Christmas tree harvests throughout the last 65 years.

Nutrient Cycling

Coarse and fine woody debris provide a crucial component in forested environments through nutrient cycling, microbial habitat, moisture retention and protection from mineral soil erosion. (Harmon et al 1986). While coarse woody debris decays at various rates due to local climatic conditions, the advanced stages of decay contains many nutrients and holds substantial amounts of moisture for vegetation during dry periods (Larson et al. 1978, Wicklow et al. 1973). Forest management can affect the volumes of fine

and coarse woody debris through timber harvesting and result in changes to the available nutrients for long term forest production. The method for quantifying the coarse woody debris is described in the *Handbook for Inventorying Downed Woody Material* (Brown, 1974)

DESCRIPTION OF ALTERNATIVES

- *No-Action Alternative*

No timber harvesting or associated activities would occur under this alternative.

- *Action Alternative*

Units totaling approximately 604 acres would be commercially harvested under this alternative. All of the proposed harvest would be a shelterwood harvest that would maintain approximately 10 to 20 overstory trees per acre. Advanced regeneration remaining after harvest operations would vary by unit and site specific location. Harvesting would be conducted using conventional ground-based equipment on approximately 574 acres; approximately 30 acres would require skyline cable yarding. Approximate miles of road activities include:

- 0.59 miles of new construction (0.38 permanent road and 0.21 temporary road)
- 4.5 miles of reconstruction
- 0.23 miles of road reclamation/abandonment
- 2.4 miles would be maintained or have drainage improvements installed as necessary to protect water quality.

Recommended Mitigation Measures and Contract Clauses

ARM 36.11.422 (2) and (2) (a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, would be implemented during harvesting operations:

- 1) Limit equipment operations to periods when soils are relatively dry, (less than 20 percent of oven-dried weight), frozen, or snow-covered to in order to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- 2) On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) would not be used unless impacts can be adequately mitigated. Regardless of use, these trails may be closed with additional drainage installed, where needed, or grass-seeded to stabilize the site and control erosion.
- 3) Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive displacement or erosion. Based on site review, short, steep slopes may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline, and skidding from more moderate slopes of less than 40 percent.
- 4) Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrently with operations.
- 5) Slash disposal: Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent, unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Consider disturbance incurred during skidding operations to, at least, partially provide scarification for regeneration.

- 6) Retain 10 to 20 tons of large woody debris (depending on habitat type) and a feasible majority of all fine litter following harvesting operations. On units where whole tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

Issue Statement	Analysis Methods & Analysis Area	Existing Condition	Direct, Indirect and Cumulative Effects	
			No Action Alternative	Action Alternative
Ground based harvest techniques can displace and compact soils which can adversely affect the hydrologic function, soil structure and long-term productivity of the impacted area.	<p>Methods for disclosing impacts include using general soil descriptions and the management limitations for each soil type. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 90 DNRC postharvest monitoring projects. (DNRC, 2011).</p> <p>The analysis area will be the proposed harvest units and road locations.</p>	<p>Approximately 501 acres of the parcel have soil types with low to moderate erosive potential. The remaining 139 acres has a high erosion potential due to fine textured soil. Sediment delivery potential is low on all soils except for 6 acres near a stream with no harvest proposed.</p> <p>An estimated 5 to 10 percent of the parcel has been impacted by roads and skid trails from previous entries and recreation use.</p> <p>Impacts from past timber harvest projects on similar soils has resulted in average impacts of 14.2 percent.</p>	<p>No timber harvesting or associated activities would occur under this alternative. Skid trails from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases.</p>	<p>The action alternative would be expected to have soil impacts from compaction, displacement and erosion similar to the average from the DNRC Soil Monitoring data (DNRC, 2011) or approximately 14.2%. Cumulative effects would be managed at acceptable levels by reusing existing skid trails where appropriate. A list of mitigation measures and contract clauses are listed that would help minimize cumulative impacts.</p>
Removal of both coarse and fine woody material off site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.	<p>Coarse woody material will be addressed by, first, disclosing existing levels from transect data collected during field reconnaissance. The transect data will be compared with scientific literature as required by ARM 36.11.414 (2). If the action alternative is selected, this assessment will assist in developing contract requirements and mitigation measures necessary to ensure post project levels of CWD adequately meet the recommendations of relevant literature, primarily Graham et al (1994). Fine woody material will be addressed solely through contract language that minimized removal (ARM 36.11.410).</p> <p>The analysis area will be the proposed harvest units.</p>	<p>A total of 10 transects were measured in the proposed harvest units. The average tons per acre were 5.4 with a minimum of 0 and a maximum of 15.7 tons per acre.</p> <p>Recommended levels for general habitat types in the proposed harvest units are estimated at 5 to 25 tons per acre. Most of the transects (6 of 10) were below the recommended level.</p>	<p>No changes to coarse woody material would result from this alternative. Coarse woody debris levels and nutrient cycling would continue as dictated by natural events.</p>	<p>An increase in coarse woody debris would result from the action alternative; however an overall reduction in recruitable fine material would be expected due to fewer trees remaining per acre until stocking levels are increased.</p> <p>Both fine and large woody debris would be retained for nutrient cycling for long-term soil productivity. By following research recommendations on the levels of coarse and fine material left on site, the risk of cumulative impacts to forest productivity from nutrient pool loss would be low.</p>

References:

- Brown, J.K. 1974. Handbook for inventorying downed woody material. In: USDA and Forest Service (Editors). Ogden, Utah: Intermountain Forest and Range Experiment Station.
- Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.
- DNRC, 1996. State Forest Land Management Plan Final Environmental Impact Statement. Montana Department of Natural Resources and Conservation, Forest Management Bureau. Missoula, MT.
- DNRC, 2005. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 1988-2004. Prepared by J. Collins, Forest Management Bureau. Missoula, MT.
- DNRC 2011. DNRC update to the Compiled Monitoring Report. Includes data from 1988 through 2011. Unpublished. Prepared by J. Schmalenberg, Forest Management Bureau, Missoula, MT.
- Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D. S. Page-Dumroese. 1994. *Managing Coarse Woody Debris in Forest of the Rocky Mountains*. USDA Forest Service Research Paper. INT-RP-447. 13 pp.
- Harmon, M.E.; J.F. Franklin, and F. J Swanson. 1986. Ecology of coarse woody debris in temperate ecosystems. *Advances in Ecological Research*, Vol. 15. New York: Academic Press: 133-302.
- Sasich, J. and Lamotte-Hagen, K. 1989. Land System Inventory of the Lolo National Forest. USDA Forest Service, Missoula, Montana
- Wicklow, M.C., W. B. Bolen, and W.C. Denison. 1973. Comparison of Soil micro-fungi in 40-year-old stands of pure alder, pure conifer and alder-conifer mixtures. *Soil Biology and Biochemistry*, 6:73-78.

WILDLIFE ANALYSIS

INTRODUCTION

This analysis discloses the existing condition of relevant wildlife resources, and displays the anticipated effects that may result from each alternative of this proposal. There is a general discussion on the analysis areas and analysis methods employed to disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources in the analysis area from the proposed actions. Past and current activities on all ownerships in each analysis area, as well as known planned future agency actions, have been taken into account for the cumulative effects analysis.

Considerations and concerns raised by DNRC specialists and public comments received during initial scoping for the proposed project led to the following list of issues:

- The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.
- The proposed activities could result in the modification of habitat preferred by Canada lynx (*Felis lynx*) and decrease the area's suitability for lynx.
- The proposed activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles (*Haliaeetus leucocephalus*).
- The proposed activities could decrease habitat suitability for fishers (*Martes pennanti*) by decreasing canopy cover in mature forest stands, decreasing abundance of snags and coarse woody debris, and by increasing roads, which could elevate risk of trapping mortality.
- The proposed activities could alter the structure of flammulated owl (*Otus flammeolus*) preferred habitat types, which could reduce habitat suitability for flammulated owls.
- The proposed activities could displace gray wolves (*Canis lupus*) from the vicinity of the project area, particularly denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.
- The proposed activities could negatively affect pileated woodpecker (*Dryocopus pileatus*) habitat suitability by removing canopy cover and snags used for foraging and nesting, and by creating disturbance.
- The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, increasing roads in secure areas, and disturbing animals.

ANALYSIS AREAS

The discussions of existing conditions and environmental effects will focus on two different spatial scales. The first scale will be the "project area," which was used to assess direct and indirect effects to wildlife species and their habitats. The "project area," totaling 640 acres, consists of portions of Township 23 North, Range 27 West, Section 14. This project area surrounds the proposed timber harvest units and is the area where all proposed new road construction would occur. The project area consists of lands included in DNRC's Habitat Conservation Plan (HCP). Elevation within the project area ranges between 2,960 and 3,600 feet. The proposed project area contains a variety of slope aspects and wildlife habitats.

The second scale is the "cumulative effects analysis area," which refers to the surrounding landscape for assessing cumulative effects to wildlife species and their habitat. Cumulative effects analysis areas (CEAAs) are named according to the size of the area and are summarized in TABLE W-1 –WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS. CEAAs include the project area as well as lands managed by other agencies and private landowners. Detailed descriptions of each analysis area are located in the **Existing Environment** section for each issue or wildlife species evaluated. In general, cumulative effects analysis areas were delineated to approximate the size of a focal species' home range or to approximate a surrounding landscape in which the proposed activities could most likely have measureable cumulative effects to wildlife habitat. See FIGURE W-1- WILDLIFE ANALYSIS AREAS for a map showing the project and cumulative effects analysis areas.

TABLE W-1. WILDLIFE ANALYSIS AREAS. Descriptions of the project area and CEAAs.

ANALYSIS AREA NAME	DESCRIPTION	TOTAL ACRES	ISSUE(S)/SPECIES ANALYZED
Project Area	DNRC managed land in section 14, T23N, R27W.	640	direct & indirect effects for all issues/species
Small CEEA	The project area and 8 sections surrounding it.	5,792	mature forests and connectivity, snags and coarse woody debris, flammulated owls, and pileated woodpeckers
Bald Eagle CEEA	The home range of the Big Prairie/Thompson River bald eagle territory.	12,566	bald eagles
Large CEEA	Portions of the Chippy Creek, Lower Fishtrap Creek, Lower Little Thompson River, Marten Creek, and Middle Thompson River HUC 12 watersheds surrounding the project area.	48,455	Canada lynx, fishers, gray wolves, and big game

In December 2011, DNRC adopted a Habitat Conservation Plan (HCP) in cooperation with the USFWS to minimize potential impacts of the Forest Management Program to grizzly bears, Canada lynx and three species of fish. This effects assessment tiers to the detailed analyses contained in the DNRC HCP EIS (USFWS and DNRC 2010).

ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a coarse-filter approach, which favors a mix of stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a fine-filter approach for threatened, endangered, and sensitive species (ARM 36.11.406). The fine-filter approach focuses on habitat requirements of several individual species.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of information and techniques were used. Field visits, scientific literature, DNRC's stand level inventory (SLI) data, aerial photographs, USDA Forest Service Geographical Information System (GIS) data, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area, or the species would not be affected by any alternative.

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Ongoing and proposed timber sale projects that could contribute to cumulative effects are summarized in TABLE W-2 RECENT AND PROPOSED PROJECTS. In addition to projects listed in TABLE W-2, the Calico Timber Sale has been proposed in the area. The project area for the proposed Calico Timber Sale is located approximately 0.5 miles outside of the largest CEAA used in this wildlife analysis and is therefore not included in TABLE W-2.

TABLE W-2. RECENT AND PROPOSED PROJECTS. Recent and proposed timber harvest projects that could contribute to cumulative effects and the number of harvested acres that occur in each analysis area.

Sale Name	Agency	Status	Project Area	Eagle CEAA	Large CEAA
Thomson Face	DNRC	ongoing	-	-	164

Changes to vegetation and forest structure resulting from all DNRC projects, with the exception of the ongoing Thompson Face Timber Sale, have been accounted for in SLI data used for this analysis. The effects of ongoing sales on wildlife will be discussed in cumulative effects analyses.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various policy and procedural documents provide the foundation for management criteria pertaining to wildlife and their habitat on state lands. The documents most pertinent to this project include *DNRC Forest Management Rules*, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan* (hereafter HCP), the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

COARSE FILTER WILDLIFE ANALYSIS

MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY

Issue: The proposed activities could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.

Introduction

A variety of wildlife species rely on older, mature forests to meet some or all of their life history requirements. Mature forests, generally characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, resting areas, and/or travel corridors for certain animals. Wildlife use of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be strongly associated with mature and old forests include American marten (*Martes americana*), northern goshawk (*Accipiter gentilis*), and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events; primarily wildfire, blowdown, and pest outbreaks. Resulting broad landscape patterns were a mosaic of forest patches varying in age, composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open, non-forested patches that over time develop into young, conifer forests. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest and associated roads may be avoided by certain wildlife species adapted to mature, well-stocked forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Areas

Direct and indirect effects were analyzed on the project area (640 acres). Cumulative effects were analyzed on the surrounding sections directly adjacent to the proposed project area sections (small CEAA = 5,792 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale of analysis would be large enough to support a diversity of species that use mature forested habitat and/or require connected forested habitats and centers evaluation of cumulative effects on those areas most likely to be affected by the proposed action.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, DNRC's stand level inventory (SLI) data, aerial-photograph interpretation, USDA Forest Service data (VMap 9.1.1), and GIS analysis. Mature forested habitat was defined as forest stands typically >100 years old with ≥40% canopy cover comprised primarily of trees >9 inches dbh. Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of many wildlife species that benefit from well-connected mature forest conditions across the landscape. Road density was calculated in linear miles per square mile by dividing the number of road miles by the specified analysis area in square miles. Factors considered in the analysis include: 1) availability of mature forested habitats (≥40% canopy cover, >9 inches dbh), 2) average patch size, 3) the degree of timber harvesting, 4) open and restricted road density, and 5) the availability of potential travel corridors.

Existing Environment

The project area currently contains approximately 575.2 acres (89.9% of project area) of Douglas-fir/western larch, ponderosa pine, and mixed-conifer stands that have a reasonably well-developed canopy (≥40% crown closure). Approximately 41.4 acres (6.5% of project area) consist of mature stands with a more open canopy (<40% crown closure) within the project area. Small scattered clearings, a cabin lease site, and roads occupy another 23.4 acres of the project area. The majority of the project area has undergone selective harvest between the 1940's and 1980's, which has likely influenced the composition of mature stands currently found there. Within most stands, trees >9" dbh are relatively abundant, however large trees >15" dbh are less common (average 12 trees/acre, n=10 plots) and not evenly distributed (range 0-26 trees/acre). Mature forested stands are well-connected within the proposed project area, functioning as one forest patch (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY CORRIDORS). Old-growth forest, as defined by Green et al. (1992), is not present within the proposed project area. Small, dense patches of regenerating conifers less than 30 feet in height are common and interspersed throughout the area.

Approximately 7.4 miles (7.2 miles/sq. mile) of roads exist in the project area (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). Within the project area, 7.2 miles of road are open to public motorized use and 0.2 miles are currently restricted to non-motorized use by the public. Of the 7.2 miles of open roads, approximately one mile of primary county/easement roads passes through the project area. Approximately 5.6 miles of open road consist of narrow, unmaintained two-tracks that likely receive only occasional use, primarily during hunting seasons in the fall. All of the road miles within the project

area are accessible by wheeled motor vehicles during mild to average winter conditions, however only one mile is plowed. Due to abundant mature forest cover and existing road attributes, habitat connectivity for species using older (100+ years), undisturbed forest is fair to good within the project area (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY CORRIDORS).

Abundance and locations of mature, closed canopy forest within the small CEAA is influenced by land ownership patterns, past timber harvest, and existing covertypes. Lands within the small CEAA are comprised of DNRC (38.0%), Plum Creek Timber (60.0%), and other private owners (2.0%). Presently, 25.2 percent (1,459.8 acres) of the small CEAA contains relatively well-connected mature forest stands possessing $\geq 40\%$ crown closure. Most of these stands (1,172.1 acres) occur on DNRC lands within the small CEAA. Approximately 287.7 acres (5.0% of CEAA) of mature forest with $\geq 40\%$ crown closure occurs on private industrial timberlands and other private lands. Average patch size of mature forest in the small CEAA is 48.6 acres (30 patches, range 0.03 to 741.5 acres). Landscape connectivity of mature forest stands within the CEAA is low to moderate, with three larger patches on DNRC lands providing some connectivity throughout the central and southeast portions of the CEAA. Remaining portions of the CEAA contain relatively small mature forest patches averaging 11 acres (27 patches). Dry, open slopes are present throughout the CEAA and further limit connectivity of well-stocked stands. Unharvested patches of mature forest adjacent to streams offer some linear connectivity on private industrial timberlands within the CEAA. About 3,505 acres of the CEAA (60.5%) has been harvested with regeneration-type treatments within the last 40 years. Approximately 3,227.0 acres (55.7% of CEAA) of private timberlands have likely been harvested within the last 20 years. These lands consist of young, regenerating forest with few large scattered trees and do not provide suitable habitat for species that utilize well-stocked, mature forests. Dry uplands meadows and wetland/riparian meadows comprise 149.0 acres (2.6%) of the CEAA. Within the small CEAA, there are 22.6 miles of open roads that equate to a density of 2.6 miles/square mile. These roads are primarily forest roads used for logging and recreational activities within CEAA and the surrounding area. Unrestricted open roads located within the project area comprise 1/3 of the open roads within the CEAA. Across the CEAA, mature forest habitat and landscape connectivity are low to moderate for species that require and/or prefer these conditions.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity

Under this alternative no timber harvesting activities would occur. This would result in: 1) no changes to existing stands; 2) no appreciable changes to forest age, the distribution of forested cover, or landscape connectivity; and 3) no changes to wildlife use. Thus, no direct or indirect effects to mature forested habitat suitability and connectivity would be expected.

Direct and Indirect Effects of the Action Alternative on Mature Forested Habitat and Connectivity

Under the Action Alternative, approximately 604 acres (94.4% of the project area) would be harvested. Of these acres, 553 acres (86.4% of the project area) of dense, mature forest would undergo harvesting (see TABLE W-3 – MATURE FORESTED HABITAT). All of these acres of mature forest would receive harvest treatments that would reduce overstory crown closure from $>40\%$ to 5-15% and increase mature tree spacing to 55-70 feet. Species that rely on these mature forested habitats would experience a reduction in habitat for 50-80 years. Under the proposed silvicultural prescriptions, residual trees would be healthy seral species (e.g. ponderosa pine, Douglas-fir). Existing patches of dense regenerating conifers would be retained where feasible, which would provide a measure of structural complexity to remaining stands. Average mature forest patch size would be reduced from 490 acres (2 patches) to 3.5 acres (5 patches). Remaining mature forest and connectivity would primarily be located in the southwest corner of the parcel and along riparian areas in a linear fashion (see FIGURE W-2 - MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY CORRIDORS). Approximately 22 acres (3.4%) of mature forest in the project area would remain unharvested and could provide suitable habitat for species utilizing smaller patches of mature forest, particularly those associated with riparian areas. Two remaining unharvested areas would remain connected to larger patches of mature forest outside of the project area. Existing mature forest would be retained within 150 feet of the Thompson River, the

only Class 1 stream within the project area. After harvesting, the project area would continue to provide a variety of forested habitat conditions for wildlife, but the proportions of these habitats would change. After harvest, covertypes and habitat conditions would likely more closely resemble historical conditions in this area; with widely spaced large-diameter seral species (Losensky 1997). Wildlife species preferring larger continuous patches of well-stocked mature forest would likely find the project area unsuitable for 50-80 years. After harvest completion, the project area would appear more similar to adjacent private industrial forestland surrounding the project area, and patch size of young, regenerating forest stands would increase. In general, under this alternative, habitat conditions would improve for species adapted to more open forest conditions with seral species, while reducing habitat quality for species that prefer dense, mature forest habitats.

TABLE W-3 – MATURE FORESTED HABITAT. Existing acres, proposed harvest acres, and percentages of mature forested habitat possessing ≥40% canopy closure within the project area and cumulative effects analysis area.

Analysis Area	Total Acres	Mature Forested Habitat Present (% area)	Proposed Harvest Under Action Alternative (% area)	Mature Forested Habitat Post-Harvest (% area)
Project Area	640	575.2 (89.8%)	553.2 (86.4%)	22.0 (3.4%)
Small Cumulative Effects Analysis	5,792	1459.8 (25.2%)	553.2 (9.6%)	906.6 (15.7%)

Under the Action Alternative, approximately 0.4 miles of new permanent restricted road and 0.2 miles of new temporary road would be constructed. No new open roads would be built under the Action. During harvest activities, up to 7.9 miles of road (open, restricted and temporary) within the project area could receive use and have elevated traffic levels (see TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). Under the Action Alternative, approximately 5.3 miles of open road would be closed to public motorized use. Additionally, approximately 0.2 miles of existing restricted road would be obliterated to discourage unauthorized motorized access. Thus, total open roads would be reduced by 5.6 miles at the end of harvesting activities. All 0.2 miles of temporary roads would be reclaimed and closed to all motorized vehicles. At the conclusion of the proposed project, the total amount of roads would increase by 0.2 miles and overall road density would increase from 7.3 to 7.5 miles/sq. mile.

Thus, moderate to high adverse direct and indirect effects to connectivity and suitability of mature forested habitat in the project area would be expected since: 1) harvesting would appreciably reduce tree density and existing cover on approximately 575 acres (96.2%) of existing available mature stands, 2) connectivity of mature forest would be altered with an increase in the number of patches from 2 to 5 and a decrease in average patch size from 490 to 3.5 acres, 3) a measure of connectivity would be maintained on 22 acres (3.4% of project area) of mature forest along riparian areas and connected to adjacent patches outside the project area, and 4) open road density would be reduced by 5.5 miles.

TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION. Miles and density (miles/square mile) of existing road and new road that would be used in the project area under the proposed Action Alternative.

Road Types	Existing Condition Road Miles (mi./sq. mi.)	During Proposed Activities Road Miles (mi./sq. mi.)	After Proposed Activities Road Miles (mi./sq. mi.)
Open	7.1 (7.1)	7.7 ^a (7.7)	1.6 (1.6)
Restricted Road	0.2 (0.2)	0 (0)	5.9 (5.9)
Temporary Road	0 (0)	0.2 (0.2)	0 (0)
Total Roads	7.3 (7.3)	7.9 (7.9)	7.5 (7.5)

^a Of the 7.7 miles of road that would be functionally open during activities, 1.6 miles would be open for public motorized access.

Cumulative Effects of the No-Action Alternative on Mature Forested Habitat and Connectivity

Under this alternative no timber harvesting activities would occur. Thus: 1) no changes to existing stands would occur, 2) no further changes to the suitability of mature forested cover or connectivity would be anticipated, and 3) no changes to wildlife use would be expected. Past and ongoing forest management projects have affected mature forest wildlife habitat in the CEAA, and other proposed projects could affect mature forest habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). No additional cumulative effects to connectivity and suitability of mature forested habitat are expected to result from the No-Action Alternative that could affect wildlife in the CEAA.

Cumulative Effects of the Action Alternative on Mature Forested Habitat and Connectivity

Proposed harvesting would remove 553 acres (9.6% of the CEAA) of mature forest stands within the CEAA (see TABLE W-3 – MATURE FORESTED HABITAT). This harvest would result in a reduction of 37.9% of the total 1460 acres of mature forest habitat currently available. Reductions in mature forested habitats associated with this alternative would be additive to losses associated with past harvesting activities and any ongoing activities within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). Across the CEAA, 15.7% of mature, forested habitats would remain and landscape connectivity would be altered to a moderate degree given the existing condition of the surrounding forested landscape. Existing landscape connectivity would be reduced, as the number of mature forest patches would increase from 30 to 41. Average patch size would decrease from 49 acres to 22 acres. The largest retained mature patch within the project area (11 acres) would remain connected to a larger 135-acre patch of mature stands within the CEAA. Connectivity of mature forest within the CEAA would be reduced further from existing low/moderate levels. Some limited connectivity would be maintained through forest retention along linear features such as riparian areas, however these features are relatively rare within the CEAA. Habitat for species associated with dense, mature stands would be reduced in the CEAA. Wildlife species using and preferring young forest stands in the CEAA would benefit from increases in habitat within the project area for 10-30 years post-harvest.

In addition to the 7.9 miles of potential road use within the project area, approximately 1.6 miles of open road would receive appreciable increased traffic within the CEAA. Thus, a total of 9.5 miles of combined open, restricted and temporary roads would see additional use within the CEAA during project activities. Proposed harvesting and associated activities could temporarily increase (up to 3 years) open road density within the CEAA from 2.6 miles/sq. mile to 2.7 miles/sq. mile. After project completion, open road density would be reduced to 1.9 miles/sq. mile. Thus, moderate adverse cumulative effects to mature forested habitat suitability and connectivity for wildlife would be expected in the CEAA since: 1) harvesting would remove 553 acres (37.9%) of existing mature forest in the CEAA and average patch size would be reduced from 49 acres to 22 acres; 2) current availability of mature, closed canopy habitat

would be reduced and existing connectivity would be altered; 3) existing mature forest connectivity would be maintained through the small number of riparian areas present inside the CEAA; and 4) long-term open road density associated with this Action would be reduced by 0.7 miles/sq. mile.

SNAGS AND COARSE WOODY DEBRIS

Issue: The proposed activities could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes.

Introduction

Snags and coarse woody debris are important components of forested ecosystems. The following are five primary functions of snags and downed logs in forest ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat substrate for wildlife, and 5) act as storehouses for nutrient and organic matter recycling agents (Parks and Shaw 1996).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (Hejl and Woods 1991). The quantity, quality, and distribution of snags affect the presence and abundance of many wildlife species relying upon them. Snags provide foraging sites for insectivorous species and provide structures used by primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) provide habitat for secondary cavity users, including other birds and small to mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Large, tall snags tend to provide nesting sites, while short snags and stumps tend to provide feeding sites (Bull et al. 1997). Many species that use small-diameter snags will also use large snags; however, the opposite is not true. Typically, old stands will have greater numbers of large snags. The density of snags is another important indicator of habitat quality for some cavity-nesting species. Species such as the black-backed woodpecker tend to nest and forage in areas where snag densities are high, using one snag for nesting and others nearby for foraging and roosting.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Several mammals rely on downed logs and snags for survival and reproduction. The size, length, decay, and distribution of woody debris affect the capacity of various species to meet their life requisites. Single, scattered downed trees can provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles may provide foraging sites for weasels and secure areas for snowshoe hares.

Analysis Areas

Direct and indirect effects were analyzed within the project area (640 acres). Cumulative effects were analyzed within the surrounding sections directly adjacent to the proposed project area (5,792 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). Wildlife species associated with snags and coarse woody debris found in the small CEAA would be those most likely to be influenced by cumulative effects associated with nearby activities and proposed habitat alteration on the project area.

Analysis Methods

The abundance of snags and coarse woody debris were quantitatively estimated in the proposed project area using 10 systematically placed plots 0.15 acres in size. Factors considered in the analysis included the level of proposed harvesting, past timber harvest, number and species of snags, and abundance of coarse woody debris.

Existing Environment

Analysis of sampling plots and field observations indicated snags within the project area occurred at a density of 2.0 snags per acre (range 0-6.6). The average diameter of all snags >8" dbh was 10.3" dbh (range 10-11"); and snag species were lodgepole pine or Douglas-fir. No snags ≥11" dbh were observed

within project area sampling plots. Snags were generally distributed unevenly; with some areas containing higher densities than others did. The lack of large, high quality snags can be partially attributed to firewood gathering (facilitated by 7.1 miles of open roads) and harvest history, as harvest has occurred multiple times within the project area in the past. Evidence of snag use for feeding and/or cavity building by wildlife was observed in snags that were present. Coarse woody debris levels were also variable across the project area, averaging 5.4 tons per acre (range 0-15.6 tons per acre). Similar to snags, downed logs were generally small diameter (5.9" at transect line, range 3-14"), although some larger logs were observed. Thus, habitat quality for wildlife utilizing snags and/or coarse woody debris is likely moderate within the project area.

Overall, snags exist at current levels to meet DNRC's minimum-retention thresholds (*ARM 36.11.411*), although size classes are smaller than preferred. Large diameter (>21" dbh) snags and snag recruits are rare within the project area. Coarse woody debris in the majority of the project area is at the low end of the ranges recommended for the current existing habitat types (Graham et. al. 1994).

Similar to unaltered forested landscapes, snags and coarse woody debris are not distributed evenly across the project area or CEAA (Harris 1999). Snags and coarse woody debris are frequently collected for firewood near open roads, which are concentrated within the project area and along the Thompson River running north-south through the CEAA. Abundance and distribution of snags and coarse woody debris within the CEAA is likely similar to patterns observed on sampling plots, but could be lower on 3,227.0 acres (55.7% of CEAA) of recently harvested private industrial timberlands. In addition to private industrial timberlands within the CEAA, past harvesting on 1,218 acres of DNRC lands (21.0% of CEAA), has altered snags, snag recruits, and coarse woody debris levels. On these acres of harvested land within the CEAA, snag and downed wood abundance is likely lower than levels found in unharvested areas. Overall, habitat quality for wildlife utilizing snags and/or coarse woody debris is likely low to moderate within the CEAA.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris

No direct changes in the abundance or distribution of snags and downed logs would be expected. Existing snags would continue to provide wildlife habitat, and new snags and coarse woody debris would be recruited as trees die. No direct or indirect effects to habitat quality for wildlife species requiring snags and coarse woody debris would be expected since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur.

Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris

Existing snags, live recruitment trees and coarse woody debris would be altered due to timber harvesting on 604 acres (94.4%) in the proposed project area. Coarse woody debris amounts would likely remain similar to existing levels in harvest units or increase under the proposed action. Proposed harvesting would likely decrease snag abundance and the number of live trees that could be recruited into snags or coarse woody debris. Harvest prescriptions call for retention of 2 snags, and 2 large snag recruits per acre greater than 21 inches dbh where they exist, otherwise the next largest size class would be retained. Additional large-diameter recruitment trees would be left if sufficient large snags are not present. Coarse woody debris would be left in amounts ranging from 10 to 20 tons/acre, depending upon habitat type of the proposed harvest areas (Graham et al. 1994). Although current snags present in the project area are generally small diameter (average 10.3" dbh), ample live trees suitable for future snag recruitment exist within proposed harvest units. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions. Proposed treatments would be expected to promote increased tree growth, larger tree diameters, and the reestablishment of shade-intolerant species like western larch and ponderosa pine, which provide high-quality structures important for nesting and foraging. The potential future risk for snag and coarse woody debris loss due to firewood gathering would be appreciably reduced, as 5.3 miles of open road would be restricted and another 0.2 miles of open road would be obliterated. Thus, moderate adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect habitat quality of wildlife species requiring these habitat attributes since: 1) harvesting would reduce the density of existing snags and snag recruitment trees on 604 acres (94.4%

of project area), 2) coarse woody debris amounts would be retained at similar or greater levels than those existing, 3) seral tree species suitable for future high-quality snags would be favored, 4) two snags and at least two future recruitment trees per acre would be retained in all proposed treatment areas, and 5) open road access used for firewood gathering would be measurably reduced.

Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris

Snags and coarse woody debris would not be altered in the project area under this alternative. Past and ongoing forest management projects have affected snag and coarse woody debris in the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). No additional cumulative effects to habitat quality for wildlife species that utilize snags and downed woody debris are expected to result from the No-Action Alternative would be anticipated since: 1) no further harvesting would occur that could affect existing snag and coarse woody debris abundance, and 2) no changes to human access for firewood gathering would occur.

Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris

Wildlife species that rely on snags and coarse woody debris would experience a reduction in habitat quality within 604 acres (10.4% of the CEAA) of harvest units. Some snags would likely be removed from the project area, whereas coarse woody debris material would remain in similar amounts or increase. Lands of various ownerships within the CEAA have been influenced by differing management objectives over time. Thus, snags and coarse woody debris have received different levels of consideration regarding their management and retention. Generally, past harvesting on 3,505 acres across all ownerships (60.5% of the CEAA) has likely reduced these attributes. The reduction of snags associated with this alternative would be additive to the losses associated with past harvesting and any ongoing harvesting within the CEAA (see TABLE W-2 - RECENT AND PROPOSED PROJECTS). However, the project requirements to retain 2 large snags and 2 large snag recruits per acre (greater than 21 inches dbh or next largest size class), and 10 to 20 tons of coarse woody debris per acre (depending upon habitat type) would mitigate additional cumulative effects associated with this project. Approximately 1,347 acres (23.2%) within the CEAA have not been recently harvested and likely contain moderate levels of snags and coarse woody debris. Under the Action Alternative, long-term open road amounts would be reduced by 5.5 miles; thus, risk of potential loss of snags and coarse woody debris resulting from firewood gathering would be reduced. Thus, moderate adverse cumulative effects to habitat quality for wildlife requiring snags and coarse woody debris would be anticipated over the next 30-100 years since: 1) 604 acres (10.4%) of the CEAA would be harvested reducing snags and snag-recruit trees while coarse woody debris levels would increase or not appreciably change, 2) approximately 23.2% of the CEAA that has not been recently harvested would continue to provide snags and downed wood habitat attributes, 3) existing habitat quality across the CEAA is low to moderate due to past timber harvesting, 4) motorized public access and associated firewood would be reduced, and 5) there would be increased representation of shade-intolerant and seral tree species within harvest units that could become high-quality snags in the long term.

FINE-FILTER WILDLIFE ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. TABLE W-5 – FINE FILTER summarizes how each species considered was included in detailed subsequent analysis or removed from further consideration, since suitable habitat either did not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-5 – FINE FILTER. Species considered in the fine-filter analysis for the Lower McCully Timber Sale.

	SPECIES/HABITAT	DETERMINATION – BASIS
Threatened and Endangered Species	Canada lynx (<i>Felis lynx</i>) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	Detailed analysis provided below – Potential lynx habitat types occur within the project area.
	Grizzly bear (<i>Ursus arctos</i>) Habitat: Recovery areas, security from human activity	The project area is located 4 miles outside of grizzly bear recovery zone and non-recovery occupied habitat associated with the Cabinet-Yaak Ecosystem (<i>USFWS 1993, Wittinger 2002</i>) and no recent sightings of grizzly bears have occurred in the area (<i>Kasworm et al. 2011</i>). Use of the project area by grizzly bears is unlikely due to its location and surrounding unsuitable habitat. Thus, negligible direct, indirect, or cumulative effects to grizzly bears would be expected to occur as a result of either alternative.
Sensitive Species	Bald eagle (<i>Haliaeetus leucocephalus</i>) Habitat: Late-successional forest less than 1 mile from open water	Detailed analysis provided below – The proposed project area occurs within the home range of the Big Prairie-Thompson River bald eagle territory.
	Black-backed woodpecker (<i>Picoides arcticus</i>) Habitat: Mature to old burned or beetle-infested forest	No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
	Coeur d'Alene salamander (<i>Plethodon idahoensis</i>) Habitat: Waterfall spray zones, talus near cascading streams	No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
	Columbian sharp-tailed grouse (<i>Tympanuchus Phasianellus columbianus</i>) Habitat: Grassland, shrubland, riparian, agriculture	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
	Common loon (<i>Gavia immer</i>) Habitat: Cold mountain lakes, nest in emergent vegetation	No suitable lakes occur within 500 feet of the project area. Thus, no direct, indirect or cumulative effects to common loons would be expected to occur as a result of either alternative.
	Fisher (<i>Martes pennanti</i>) Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	Detailed analysis provided below – Potential fisher habitat occurs within the project area.

<p>Flammulated owl (<i>Otus flammeolus</i>)</p> <p>Habitat: Late-successional ponderosa pine and Douglas-fir forest</p>	<p>Detailed analysis provided below – Potentially suitable ponderosa pine and Douglas-fir stands occur within the project area.</p>
<p>Gray Wolf (<i>Canis lupus</i>)</p> <p>Habitat Features: Ample big game populations, security from human activities</p>	<p>Detailed analysis provided below – Wolf pack home ranges have encompassed the proposed project area in the past, and future use of the area by wolves is likely.</p>
<p>Harlequin duck (<i>Histrionicus histrionicus</i>)</p> <p>Habitat: White-water streams, boulder and cobble substrates</p>	<p>The Thompson River flows through the far southeast corner of the project area, however the river does not have records of harlequin duck sightings within 10 miles (MNHP 2013) of the project area. Appreciable amounts of high-gradient whitewater habitat are not present in the vicinity of the project area and use by harlequin ducks is not expected. Thus, negligible direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.</p>
<p>Northern bog lemming (<i>Synaptomys borealis</i>)</p> <p>Habitat: Sphagnum meadows, bogs, fens with thick moss mats</p>	<p>No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.</p>
<p>Peregrine falcon (<i>Falco peregrinus</i>)</p> <p>Habitat: Cliff features near open foraging areas and/or wetlands</p>	<p>Suitable cliffs/rock outcrops for nest sites were not observed in the project area or within 0.5 miles of the project area. Additionally, peregrine eyries have not been documented in the vicinity of the project area (MNHP 2013). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.</p>
<p>Pileated woodpecker (<i>Dryocopus pileatus</i>)</p> <p>Habitat: Late-successional ponderosa pine and larch-fir forest</p>	<p>Detailed analysis provided below – Potential suitable mature stands exist within the proposed project area.</p>
<p>Townsend's big-eared bat (<i>Plecotus townsendii</i>)</p> <p>Habitat: Caves, caverns, old mines</p>	<p>No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of either alternative.</p>

	<p>Wolverine (<i>Gulo gulo</i>)</p> <p>Habitat: Alpine tundra and high-elevation boreal and mountain coniferous forests, areas that maintain deep persistent snow into late spring</p>	<p>No potentially suitable wolverine habitat exists within the proposed project area. The project area does not maintain deep snow into late spring and does not contain high-elevation alpine habitat. While a wolverine could pass through the project area during its extensive movements, appreciable use of the area is not expected. Given the large home range area wolverines occupy (average 150+ sq. miles) and long distances wolverines typically cover during their movements, the proposed activities would not be expected to measurably affect use of the area by wolverines. Thus, no direct, indirect or cumulative effects to wolverines would be expected to occur under the proposed action.</p>
Big Game Species	<p>Elk (<i>Cervus canadensis</i>)</p> <p>Moose (<i>Alces americanus</i>)</p> <p>Mule Deer (<i>Odocoileus hemionus</i>)</p> <p>White-tailed Deer (<i>Odocoileus virginianus</i>)</p>	<p>Detailed analysis provided below – Year-round use by deer, elk, and moose is possible. Big game winter range is present within the project area.</p>

THREATENED AND ENDANGERED SPECIES

CANADA LYNX

Issue: The proposed activities could result in the modification of habitat preferred by Canada lynx and decrease the area's suitability for lynx.

Introduction

Canada lynx are listed as "threatened" under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Lynx abundance and habitat use are strongly associated with snowshoe hare populations; thus activities which decrease habitat quality for snowshoe hares can reduce the availability of prey for lynx. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares including dense, young and mature coniferous stands (Squires et al. 2010). Forest type, tree densities, natural disturbance history, and time since harvesting play important roles in shaping the suitability of young foraging habitat for lynx. Mature subalpine fir stands with abundant horizontal cover and coarse woody debris also provide structure important for foraging, denning, travel, and security. These conditions are found in a variety of habitat types (Pfister et al. 1977), particularly within the subalpine fir series. Historically, northwest Montana contained a variety of stand types with differing fire regimes. This variety of stand types combined with patchy elevation and snow-depth gradients preferred by lynx, likely formed a non-continuous mosaic of lynx and non-lynx habitats (Fischer and Bradley 1987, Ruggiero et al. 1999, Squires et al. 2010). Forest management considerations for lynx include providing a mosaic of young and mature lynx habitats that are well connected across the landscape.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. The cumulative effects analysis area consisted of portions of the Chippy Creek, Lower Fishtrap Creek, Lower Little Thompson River, Marten Creek, and Middle Thompson River HUC 12 watersheds surrounding the project area. (48,455 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). The large CEAA approximates the size of a lynx home range and is defined according to geographic features (i.e. ridgelines, wildfire boundaries), which are likely to influence movements of Canada lynx in the vicinity of

the project area. Thus, this defined area provides a reasonable analysis area for Canada lynx that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of SLI data and suitable lynx habitats. Suitable lynx habitat was subdivided into the following lynx habitat types: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. Classification occurred according to DNRC HCP lynx habitat mapping protocols (DNRC 2010) based upon a variety of vegetation characteristics important to lynx and snowshoe hares (i.e., forest habitat type, canopy cover, stand age class, stems/acre, and coarse woody debris). Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat. The temporary non-habitat category consists of non-forest and open forested stands that are not expected to be used appreciably by lynx until adequate horizontal and vertical cover develops. On non-DNRC lands, data identifying lynx suitable habitat are not readily available. Therefore, for the purpose of this analysis, the stands considered most likely to provide suitable habitat for lynx were mature forest stands ($\geq 40\%$ canopy cover, >9 inches dbh average) below 6,000 feet elevation. Factors considered in the analysis include: 1) the abundance of lynx habitat types, 2) landscape connectivity, and 3) the level of harvesting.

Existing environment

Approximately 400 acres (62.5%) of potential lynx habitat occurs in the 640 acre project area. Of this potential habitat, all 400 acres (62.5%) are currently providing suitable habitat (TABLE W-6 – LYNX HABITAT). Suitable lynx habitat within the project area is defined as the sum of the summer foraging, winter foraging, and “other suitable” lynx habitat categories. In the project area, winter foraging habitat is the most abundant type of suitable habitat (TABLE W-6 – LYNX HABITAT). Amounts of coarse woody debris were quantitatively assessed within the project area and found to be slightly low or within the appropriate levels for the habitat types present (see SNAGS AND COARSE WOODY DEBRIS section of this analysis for further detail). Additionally, limited riparian areas are located within the proposed project area that provide a few potential travel corridors for lynx, should they be present in the area. Past harvesting throughout the proposed project area from 1940-1989 has altered lynx habitat, however abundant horizontal and vertical cover currently exists. Throughout the project area, habitat and connectivity conditions are moderate for potential use by lynx, however shallow snow depths, lower elevation (below 4,000 feet), and surrounding unsuitable habitat likely limit extended use by lynx.

Canada lynx have been documented within the CEAA in the past, but not within the last 25 years (DNRC unpublished data, and MNHP 2013). DNRC manages 21% of the CEAA, Plum Creek owns 62%, USDA Forest Service administers 15%, and other private owners account for 2% of the CEAA. DNRC lands within the large CEAA contain a total of 2,082 acres of potential lynx habitats, including 1,419 acres of currently suitable habitat (TABLE W-6 – LYNX HABITAT). Approximately 6,905 acres (14.3% of CEAA) of potential lynx habitat with $>40\%$ mature crown closure occur on other ownerships. The remaining 39,468 acres (81.5%) in the CEAA consists primarily of stands that do not contain structure suitable for lynx use as well as stands that are not appropriate cover types (i.e., dry Douglas-fir and ponderosa pine stands). The distribution of the various lynx habitat elements on lands within the CEAA is the result, primarily, of past natural disturbances, past timber harvesting, and the presence of cover types not preferred by lynx. For instance, only 20% of DNRC lands within the CEAA contain habitat types preferred by lynx (TABLE W-6 – LYNX HABITAT). Timber harvest on approximately 26,927 acres within the last 30 years, combined with unsuitable cover types on drier low-elevation slopes, likely limits habitat suitability and connectivity of lynx habitat throughout the CEAA. Additionally, approximately 6,998 acres (14.4%) of the CEAA underwent stand-replacement wildfire during the Chippy Creek Fire in 2007. As a result, the majority of these lands do not currently contain habitat suitable for lynx use. USDA Forest Service lands in the northwest quarter of CEAA (7,471 acres, farthest from the project area) likely consist of the highest-quality habitat in the area: elevation is higher, average snow depth deeper, historic harvest levels were less intensive and habitat connectivity is higher. In the vicinity of the project area and in surrounding private timberlands, connectivity of lynx habitat is low due to the lack of suitable habitat.

TABLE W-6 – LYNX HABITAT. Estimates of existing lynx habitat and habitat that would persist post-harvest on DNRC lands in the project area and cumulative effects analysis area. Percent refers to the percent of the lynx habitat category of the total potential habitat^a present on DNRC-managed lands.

LYNX HABITAT CATEGORY	Acres of lynx habitat (percent of DNRC lynx habitat)			
	Project Area		Cumulative Effects Analysis Area	
	Existing	Post-Harvest	Existing	Post-Harvest
OTHER SUITABLE	0.0 (0%)	0.0 (0%)	306.8 (14.7%)	306.8 (14.7%)
SUMMER FORAGE	0.0 (0%)	0.0 (0%)	15.2 (0.7%)	15.2 (0.7%)
TEMP NONSUITABLE	0.0 (0%)	391.3 (97.9%)	756.2 (36.3%)	1,147.5 (55.1%)
WINTER FORAGE	399.7 (100%)	8.5 (2.1%)	1,004.2 (48.2%)	612.9 (29.4%)
Grand Total: Suitable Lynx Habitat	399.7 (100%)	8.5 (2.1%)	1,326.2 (63.7%)	934.9 (44.9%)

^a Total potential lynx habitat is a habitat category that describes all areas that are providing suitable lynx habitat now, or those likely to provide suitable habitat at some time in the future. Total potential lynx habitat is the sum of the other suitable, summer forage, temporary non-suitable, and winter forage habitat categories.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Canada Lynx

Under this alternative, no changes in lynx habitat elements would be expected in the project area and landscape connectivity would not be altered. Thus, no direct or indirect effects influencing lynx habitat suitability would be expected to occur in the project area.

Direct and Indirect Effects of the Action Alternative on Canada Lynx

Approximately 391 acres (61.1% of project area) of suitable lynx habitat would be subject to harvesting with this alternative. Proposed harvest prescriptions on 391 acres of suitable lynx habitat would decrease mature tree abundance to 10-20 trees per acre and reduce overstory crown closure to <15%. All acres of suitable lynx habitats inside harvest units would be converted to temporary non-suitable habitat (TABLE W-6 – LYNX HABITAT) for the next 15-20 years. Where operationally feasible, existing patches of shade-tolerant sub-merchantable conifers would be retained. The total area of these patches would not be expected to comprise more than 15% of the acres proposed for harvest. Growth of retained mature trees and patches of sapling to pole-sized conifers, combined with post-harvest conifer regeneration following harvest, would lessen the time logged stands would be temporarily unsuitable for lynx. Activities associated with active logging operations could temporarily displace any lynx using the area for 1-3 years. Following proposed logging, 9 acres (1.3% of project area) of suitable lynx habitat would remain within the project area. Although vegetation retention along streams could facilitate lynx movement in the area, appreciable use by lynx would not be expected in the project area for 15-20 years. In the proposed harvest units, 10 to 20 tons/acre of coarse woody debris would be retained that would provide horizontal cover and security structure for lynx and lynx prey, once harvest units regenerated into suitable habitat in 15-20 years. Thus, moderate adverse direct and indirect effects to habitat suitability for Canada lynx

would be expected, since collectively: 1) the amount of existing suitable lynx habitat in the project area would be reduced by 97.9% (TABLE W-6– LYNX HABITAT); 2) coarse woody debris and patches of regenerating conifers would be retained to promote forest structural complexity in harvest units, expediting their growth back into suitable lynx habitat; 3) suitable lynx habitat within the project area is scattered and habitat connectivity to the project area is poor; and 4) vegetative cover would persist along important travel features despite an overall reduction in landscape connectivity.

Cumulative Effects of the No-Action Alternative on Canada Lynx

No appreciable change in lynx habitats would occur under this No-Action Alternative, and no further changes in landscape connectivity would be anticipated. Past forest management projects not associated with the proposed Lower McCully Timber Sale have affected lynx habitat in the CEAA, and ongoing and proposed projects could alter lynx habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Activities associated with the Thompson Face Timber Sale could continue altering lynx habitat and create disturbance within the CEAA. Thus, no additional cumulative effects to suitable lynx habitat are expected to result from the No-Action Alternative that could affect lynx habitat suitability in the CEAA.

Cumulative Effects of the Action Alternative on Canada Lynx

Under the action alternative, approximately 604 acres (1.3%) of the 45,455-acre cumulative effects analysis area would be altered by harvesting. Of these acres, harvesting would affect 391 acres of currently suitable lynx habitat. Following proposed harvesting, DNRC lands within the CEAA would contain 935 acres (1.9%) of suitable lynx habitat (TABLE W-6 – LYNX HABITAT). The proposed harvesting would alter approximately 4.8% of the 8,231 acres of potentially suitable habitat present within the CEAA. Expected reductions in suitable lynx habitat and increases in temporary unsuitable habitat in the proposed harvest units would not be expected to appreciably alter lynx use of the CEAA, particularly given that habitat suitability is low in the surrounding landscape. Following treatments, connectivity of suitable lynx habitat would remain low throughout the majority of the CEAA. Suitable lynx habitat within the CEAA is being altered by ongoing DNRC timber sales (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Increased levels of motorized activities associated with the action alternative would be additive to current and proposed timber sales, which could temporarily displace lynx should they be present near the proposed project area and associated roads. Thus, minor adverse cumulative effects to lynx and the suitability of their habitat would be expected as a result of proposed activities since: 1) overall baseline habitat suitability and connectivity would remain low; 2) existing suitable lynx habitat on DNRC lands would be reduced by 18.8% in the CEAA and those areas would remain unsuitable for at least 15 years; 3) stands converted to temporary non-suitable habitat in old logging units would continue maturing and developing into suitable habitat within the CEAA in the absence of disturbance; and 4) habitat connectivity within the CEAA would be minimally affected by proposed activities.

SENSITIVE SPECIES

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or, could become listed under the *Federal Endangered Species Act* if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful 'fine filter' for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of the *Montana Natural Heritage Database* was used to locate historical records of sensitive species (as shown in TABLE W-5 – FINE FILTER) in the vicinity of the project area.

BALD EAGLE

Issue: The proposed activities could reduce bald eagle nesting and perching habitat and/or disturb nesting bald eagles.

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, such as rivers, lakes, and coastal zones. The diet of bald eagles consists primarily of fish and waterfowl, but includes carrion,

mammals, and items taken from other birds of prey. In northwestern Montana, bald eagles begin breeding with courtship behavior and nest building in early February. The young fledge by approximately mid-August, ending the breeding process. Important habitat attributes found in nesting stands include large, emergent trees screened from disturbance by vegetation that are within sight distances of lakes and rivers.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. Cumulative effects were analyzed on the Big Prairie-Thompson River bald eagle home range, which is a 2.5-mile radius circle (12,566 acres) extending out from the nest site (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This CEEA encompasses a portion of the project area and likely includes the areas used by the pair of eagles occupying the territory.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial photograph interpretation within the bald eagle home range. Factors considered within this analysis included evaluating the potential for disturbance to nesting birds and availability of mature, well-stocked stands containing large, emergent trees with stout horizontal limbs for nests and perches.

Existing Conditions

The proposed project area contains approximately 608 acres of the Big Prairie-Thompson River bald eagle home range. Neither the nest site area nor the primary use area of the Big Prairie-Thompson River bald eagle nest occurs within the project area. Observations of eagles occupying the vicinity of the proposed project area have been recorded since 2005 (MNHP 2013). DNRC is not aware of any records of past nest sites within the project area. The Big Prairie-Thompson River territory has been active at least since 2010; with nest locations situated adjacent to the Thompson River approximately 1.3 miles from the project area. The aquatic habitats associated with this bald eagle territory are primarily the Thompson River and nearby major perennial tributaries. The Big Prairie-Thompson River bald eagle territory contains a mix of coniferous forest, riparian deciduous forests, meadows, and swamp. Within the present home range, large emergent cottonwood trees and conifers such as ponderosa pine and western larch provide suitable nesting, roosting, and perching sites. Approximately 0.2 miles of the Thompson River flows through the southeast corner of the project area and could receive use by bald eagles, although one of the county/public easement roads is directly adjacent to the river in this reach. The remaining portion of the project area consists of well-stocked forest with a dense understory and does not likely receive use by bald eagles.

Bald eagle habitat is managed at three spatial scales; the nest area (area within a 0.25-mile radius of the active nest tree or trees that have been active within five years), the primary use area (an area 0.25-0.50-miles from the nest tree), and the home range (area within 2.5 miles of all nest sites that have been active within five years). Approximately 0 acres of DNRC-managed lands occur within the nest site area, 0 acres in the primary use area, and 608 acres within the bald eagle home range.

Human disturbance, including timber harvesting, agricultural activities (e.g. haying), and various forms of recreation are potential sources of disturbance to the nesting territory. Recreational activities, traffic along open roads, and timber harvesting likely serve as the primary sources of disturbance in this eagle territory. DNRC, Plum Creek and other private land are within the primary use area. Additionally, two well-used, open roads parallel the Thompson River within Big Prairie-Thompson River bald eagle territory and these roads are situated within 800 feet of the nest site. Eagles using the Big Prairie-Thompson River territory are likely habituated to a moderate level of disturbance, given the nest's proximity to open roads and occupied dwelling. Many large, emergent trees are available across portions of the home range, but logging in the last 100 years has likely reduced some of these trees while others have experienced mortality and are declining in quality.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Bald Eagles

Under the no action alternative, no proposed activities would occur. Human disturbance would continue at approximately the same levels. No changes in available nest sites or forest structure would occur. Thus, since: 1) no increases in human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected; negligible direct and indirect effects would be expected to affect bald eagles using the Big Prairie-Thompson River territory.

Direct and Indirect Effects of the Action Alternative on Bald Eagles

The proposed project area contains approximately 608 acres of the Big Prairie-Thompson River bald eagle home range. Neither the nest site area nor the primary use area occurs within the project area. Proposed harvesting in the project area would be carried out on approximately 584 acres (96.1% of the project area) of coniferous forest occurring within the home range of the Big Prairie-Thompson River territory, and would be potentially usable by that pair. The project area and all harvest units are outside of the nest site and primary use areas. Additionally, no harvesting would occur within 150 feet of the Thompson River, the only area likely to receive use by bald eagles prior to or during harvesting. The potential for temporary displacement would only be expected to affect eagles during the physical harvest activities and not beyond. Within harvest units, prescriptions call for the retention of large seral snag species and emergent trees that could be used in the future as nest or perch trees as the stands develop around these resources. Proposed harvest units are on average >200 feet from the Thompson River, thus potential eagle nest or perch sites within site distance of the Thompson River would not be appreciably impacted. Public motorized access within the project area would be reduced, thus limiting potential for introducing additional human disturbance to this territory. Thus, minor direct and indirect effects to nesting bald eagles and bald eagle habitat would be anticipated since: 1) disturbance could be elevated within 584 acres of the territory during operations, but harvest-related disturbance would not occur within the nest site or primary use areas, 2) the eagle pair is likely habituated to high levels of disturbance closer to the nest and suitable habitat along the Thompson River than proposed activities; 3) long-term motorized access within the project area would be reduced; 4) harvesting would occur on a small proportion (4.6%) of the outermost portion of the home range area; and 5) negligible changes in the availability of large, emergent trees near water would be expected.

Cumulative Effects of the No-Action Alternative on Bald Eagles

No harvesting would occur under the no-action alternative. Thus, no additional cumulative effects to bald eagles would be expected since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected. Past forest management projects not associated with the proposed Lower McCully Timber Sale have affected bald eagle habitat in the CEAA, and ongoing and proposed projects could alter bald eagle habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS).

Cumulative Effects of the Action Alternative on Bald Eagles

Proposed harvesting would be carried out on approximately 584 acres of coniferous forest occurring within the CEAA (i.e. Big Prairie-Thompson River territory), that would be potentially usable by that pair. The acreage that would be affected comprises 4.6% of the CEAA. None of the proposed harvest activities would occur within the nest site or primary use areas. Nesting bald eagles would continue to experience varying levels of disturbance from ongoing recreational use of the CEAA, as well as disturbance associated with occupied homes and forest management activities on surrounding non-DNRC lands. Timber harvesting that may be occurring on other ownerships in the home range could continue disturbing bald eagles or modifying their habitats. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no appreciable changes in bald eagle behavior would be anticipated due to the Action Alternative. Emergent trees exist across ownerships in the home range and would be expected to persist at adequate levels. Thus, minor cumulative effects to nesting bald eagles and bald eagle habitat would be anticipated since: 1) disturbance would be elevated within the territory during harvesting operations, but harvest-related disturbance would not occur within the nest site or primary use areas; 2) no changes in long-term human access within the territory would occur; 3) negligible changes in the availability of large, emergent trees

near water within the CEAA would be expected; and 4) project activities would occur on 4.6% of the outermost edge of the CEAA.

FISHER

Issue: The proposed activities could decrease habitat suitability for fishers by decreasing canopy cover and snag/coarse woody abundance, and by increasing risk of trapping mortality through greater road access.

Introduction

Fishers are generalist predators that prey upon a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also eat carrion and seasonally available fruits and berries (Foresman 2012). Fishers use a variety of forest successional stages, but are disproportionately found in low to mid elevation mature stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994). They generally avoid openings or young forested stands (Buskirk and Powell 1994). However, some use of openings does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites, and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest management considerations for fisher involve maintaining large snags, retaining abundant coarse woody debris, providing habitat suitable for resting and denning near riparian areas, and maintaining travel corridors.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. The proposed project area ranges from 2,960 and 3,600 feet in elevation. Cumulative effects for fisher habitat were analyzed on portions of the Chippy Creek, Lower Fishtap Creek, Lower Little Thompson River, Marten Creek, and Middle Thompson River HUC 12 watersheds surrounding the project area. (48,455 acres, see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). The large CEAA approximates the size of overlapping male and female fisher home ranges and is defined according to geographic features (i.e. ridgelines, wildfire boundaries), which are likely to influence movements of fisher in the vicinity of the project area. Thus, this defined area provides a reasonable analysis area for fisher that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of travel corridors, preferred fisher cover types (*ARM 36.11.403(60)*), and habitat structure. To assess potential fisher habitat and travel cover on DNRC managed lands, sawtimber size class stands (≥ 9 inches dbh average) within preferred fisher cover types below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential habitat suitable for use by fishers (*ARM 36.11.403(60)*). On non-DNRC lands, mature forest below 6,000 feet in elevation with $\geq 40\%$ crown closure was considered to be potentially suitable habitat for fishers. Fisher habitat was further divided into upland and riparian-associated areas depending upon the proximity to Class 1 and Class 2 streams (*ARM 36.11.403(15)* and *(16)*). DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that at least 75 percent of the acreage (trust lands only) remains in the sawtimber size class in moderate to well-stocked density (*ARM 36.11.440(1)(b)(i)*). Effects were analyzed using field evaluations, GIS analysis of SLI stand data to estimate potential habitat, and aerial photograph interpretation to evaluate habitat conditions on non-DNRC lands. Potential suitable fisher habitat on non-DNRC lands was considered to be mature forest with $\geq 40\%$ crown closure generally below 6,000 feet in elevation. Snags and coarse woody debris were assessed using plot data (described in the snag and coarse woody debris analysis subsection above), site visits, and by reviewing past DNRC harvesting information. Factors considered in this analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting and trapping mortality.

Existing Environment

The proposed project area contains 207 acres (32.3% of project area) of suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Riparian fisher habitat within the project area is comprised of approximately 1.6 acres of preferred fisher cover types, of which 1.6 acres (100% of preferred cover types) of riparian

habitat are suitable for use by fishers. Snags and coarse woody debris were quantified at sampling plots within proposed harvest units and were generally found to be within or slightly lower than levels recommended by Graham et al. (1994) for the habitat types present (see WILDLIFE- SNAGS AND COARSE WOODY DEBRIS). The only Class 1 stream in the project area (Thompson River) does not have adjacent cover types preferred by fishers. Approximately 0.1 miles of an isolated Class 2 stream does contain riparian habitat suitable for use by fishers, however it is not connected to any riparian habitat outside of the project area. Within uplands on the project area, suitable fisher habitat is scattered, but provides the mature forest conditions (≥ 40 crown closure) necessary for use as fisher travel habitat. Open roads facilitate firewood gathering, which can affect the abundance of snags and CWD used by fishers. There are 7.1 miles of open roads within the project area and firewood gathering likely occurs. Additionally, roads near streams can also offer trappers convenient access to forested riparian areas, which increase trapping risk to fishers should they be using the area. The convenient vehicle access to the project area, combined with open roads on surrounding private timberland, likely facilitates trapper presence and mortality risk for fisher. DNRC is unaware of any records showing fisher use of the project area (MNHP 2013). Overall, fisher habitat suitability and connectivity within the project area is low and risk factors are high.

Historical records of fisher occurring in the CEAA within the last 50 years are generally lacking, however fishers have been documented in Sanders County (MNHP 2013, Foresman 2012). Within the CEAA on 10,348 acres of DNRC lands, there are 2,573 acres (24.9% of DNRC lands) of suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Riparian fisher habitat within the CEAA consists of approximately 126 acres of preferred fisher cover types on DNRC lands, of which 126 acres (100.0% of preferred fisher cover types) are currently suitable for use by fishers. The CEAA also contains 10,673 acres (22.0% of CEAA) of potential fisher habitat associated with areas of mature forest on non-DNRC lands. Total riparian habitat suitable for fisher use on DNRC and non-DNRC lands combined in the CEAA is 891 acres (1.8% of the CEAA). Including riparian and upland habitat, potentially suitable fisher habitat within the CEAA totals approximately 13,246 acres (27.3% of the CEAA). The majority of class 1 and 2 streams within the CEAA (below 6,000 feet elevation) have accompanying riparian vegetation that would facilitate fisher travel, and contribute to habitat suitability and connectivity, however suitable upland habitat is largely absent on private commercial timberlands within the CEAA. Within the CEAA, past harvesting has influenced mature crown closure, snags and coarse woody debris levels on about 26,927 acres (55.6%). The CEAA contains a network of existing open roads (3.0 mi/sq. mile) that facilitates trapper access, although most are not plowed, which limits motorized vehicle use during typical winter conditions. Collectively, habitat suitability for fishers within the CEAA is low to moderate.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Fishers

No change to the stands providing fisher denning and foraging habitats would be expected as no timber harvesting activities would occur under this alternative. Thus, since: 1) no changes to existing habitats would be anticipated; 2) landscape connectivity would not be altered; 3) no appreciable changes to canopy cover, snags, snag recruits, and coarse woody debris levels would be anticipated; and 4) no changes to human access or potential for trapping mortality would be anticipated, no direct or indirect effects associated with fisher habitat suitability would be expected in the project area.

Direct and Indirect Effects of the Action Alternative on Fishers

Approximately 200 acres of the 207 acres (97.1%) of suitable fisher habitat in the project area would be harvested under the Action Alternative (TABLE W-7 – FISHER HABITAT). Approximately 201 acres of upland fisher habitat within the project area harvest units would receive harvest treatments that would likely yield stands too sparsely forested for appreciable use by fishers for 40-80 years. No harvesting would occur within 100 feet of Class 1 or 50 feet of Class 2 streams. Approximately 100% (1.6 acres) of preferred fisher cover types in riparian areas would remain suitable for use by fishers, however connectivity of to this habitat would remain poor. After harvest activities, remaining suitable fisher habitat would be primarily associated with a small riparian area running through a portion of the project area. In all areas, harvest prescriptions call for retention of 2 snags and 2 snag recruits per acre (≥ 21 in. dbh)

where they exist, otherwise the next largest size class. Also 10-20 tons of coarse woody debris per acre would be planned for retention within the proposed units, which would generally increase the amount of woody debris in the area. While the proposed harvest may reduce density of snags and their recruits in the near future, the sustainability of snags in the area would be maintained by retention of appreciable numbers of shade-intolerant leave trees and snag recruitment trees. Harvest prescriptions call for retention of large, dominant trees in the project area; further improving the development and sustainability of large snags. These large snags and trees could be a source for fisher denning and resting sites in the future when intensively harvested stands regenerate and develop mature stand characteristics (40-80 years). Construction and use of new and temporary roads within the project area would not increase long-term open road density; all restricted roads within the project area would remain restricted and a large portion of currently open roads would be restricted. Because 5.5 miles of existing open roads would become restricted, fisher mortality risk due to trapping would be reduced and the risk of snags/coarse woody debris loss due to firewood gathering would be anticipated. Thus, moderate adverse direct and indirect effects would be anticipated that would affect fisher habitat suitability in the project area since: 1) harvesting would occur on a sizable amount of upland (97.1%) fisher habitat in the project area but riparian fisher habitat would be unaltered; 2) further reductions in upland habitat suitability and connectivity would occur, however baseline levels of these habitat attributes are currently low; and 3) overall risk factors associated with motorized human access would be reduced.

Cumulative Effects of the No-Action Alternative on Fishers

No additional effects to riparian or upland fisher habitats on DNRC-managed lands would be expected as no timber harvesting activities would occur under the No-Action alternative. Ongoing forest management projects not associated with the proposed Lower McCully Timber Sale have affected fisher habitat in the CEAA and other proposed projects could alter fisher habitat suitability in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Activities associated with the Thompson Face Timber Sale could continue altering fisher habitat and create disturbance within the CEAA. Thus, no further cumulative effects to fisher habitat suitability would be anticipated in the CEAA since: 1) no changes to existing habitats on DNRC ownership would occur; 2) landscape connectivity afforded by the stands on DNRC ownership would not change; 3) no changes to canopy cover, snags, snag recruits, or coarse woody debris levels would be expected; and 4) no changes to human access or potential for trapping mortality would be anticipated.

Cumulative Effects of the Action Alternative on Fishers

Approximately 200 acres (1.5%) of 13,246 acres of potentially suitable fisher habitat in the CEAA would be harvested. Of these proposed acres, 200 acres would be upland fisher habitat and 0 acres would be fisher riparian habitat. Riparian fisher habitat would not be harvested and would remain suitable for use by fishers, although habitat connectivity to the riparian area is poor. Of the approximately 126 acres of preferred fisher cover types associated with Class 1 and 2 streams on DNRC lands within the CEAA, 126 acres (100% of preferred fisher cover types) would remain suitable for use by fishers (*ARM 36.11.440(1)(b)(i)*). Reductions in upland fisher habitat would be additive to the losses associated with past and current timber harvesting in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Approximately 13,046 acres of the 48,455-acre CEAA (26.9%) would remain as potentially suitable fisher habitat (TABLE W-7 – FISHER HABITAT). Reductions in landscape connectivity of suitable fisher habitat within the CEAA would occur; however suitable forest stands along the majority of riparian areas would persist. Human access and potential trapping mortality would be reduced by the closure of 5.5 miles of open road. Thus, minor adverse cumulative effects would be anticipated that would affect fisher habitat suitability within the CEAA since: 1) harvesting would alter tree density and stand structure in 1.5% of suitable fisher habitat within the CEAA, 2) negligible changes to fisher habitat associated with riparian areas in the CEAA would be anticipated and 100% of the total preferred cover type acreage on DNRC lands would remain moderately to well-stocked, 3) suitable fisher habitat would remain connected within riparian areas where present, and 4) reductions in motorized public access would occur.

TABLE W-7 – FISHER HABITAT. Estimates of existing and post-harvest acreages of suitable fisher habitat within the project area and CEAA for the Lower McCully Timber Sale. Values in parentheses refer to the percentage of the fisher habitat in a category of the total area within the corresponding analysis area.

Fisher Habitat Category	Project Area (640 acres)		Cumulative Effects Analysis Area (48,455 acres)	
	Existing	Post-Harvest	Existing	Post-Harvest
Suitable Upland Fisher Habitat (DNRC)	205.2 (32.1%)	4.6 (0.7%)	2,447.5 (5.1%)	2,246.9 (4.6%)
Upland Fisher Habitat (non-DNRC)*	0.0 (0%)	0.0 (0%)	9,907.9 (20.4%)	9,907.9 (20.4%)
Riparian Fisher Habitat (DNRC)	1.6 (0.2%)	1.6 (0.2%)	125.9 (0.3%)	125.9 (0.3%)
Riparian Fisher Habitat (non-DNRC)*	0.0 (0%)	0.0 (0%)	765.1 (1.6%)	765.1 (1.6%)
Total Suitable Fisher Habitat (DNRC)	206.8 (32.3%)	6.2 (1%)	2,573.4 (5.3%)	2,372.8 (4.9%)
Total Suitable Fisher Habitat (DNRC lands & non-DNRC lands)	206.8 (32.3%)	6.2 (1%)	13,246.4 (27.3%)	13,045.8 (26.9%)

*Non-DNRC lands are absent from the proposed project area.

FLAMMULATED OWL

Issue: The proposed activities could alter the structure of flammulated owl preferred habitat types, which could reduce habitat suitability for flammulated owls.

Introduction

The flammulated owl is a small insectivorous species that is migratory and inhabits old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States (McCallum 1994). Flammulated owls are secondary cavity nesters, typically nesting in 12 to 25 inch dbh aspen, ponderosa pine, or Douglas-fir cavities excavated by pileated woodpeckers or northern flickers (*Colaptes auratus*). Forest management considerations for flammulated owls include providing open, dry stands of ponderosa pine and Douglas-fir with scattered dense sapling thickets, and retaining snags for nesting.

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the 3,144-acre project area. For cumulative effects, the surrounding sections and the project area were used as the scale of the analysis, for a total CEAA comprised of 5,792 acres (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale includes sufficient area to support multiple pairs of flammulated owls if ample suitable habitat is present (McCallum 1994).

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of available habitats. SLI data were used to identify preferred flammulated owl habitat types (*ARM 36.11.403(28)*). Snags were assessed during site visits using 10 systematically placed plots in the proposed project area and reviewing past DNRC harvesting information. Canopy cover, trees/acre, and cover type were considered in the analysis of flammulated owl habitat availability and structure. Factors considered in the

analysis include: 1) the degree of harvesting, and 2) the availability and structure of flammulated owl preferred habitats.

Existing Conditions

Forest stands in the project area are largely ponderosa pine, lodgepole pine, and Douglas-fir. Within the project area there are approximately 161 acres (25.2%) of potential flammulated owl habitat. Of these potential acres, over 75% currently contain dense forest conditions likely unsuitable for foraging by flammulated owls. Much of the project area (74.8%) contains cover types not preferred by flammulated owls. Site-specific growing conditions, past timber harvesting, and firewood gathering have largely influenced the abundance and distribution of flammulated owl habitat and large snags within the proposed project area. Various timber management projects have occurred within the project area from the 1940's through the 1980's. This harvesting, combined with 7.1 miles of open roads facilitating widespread firewood gathering, has likely reduced the availability of suitable large snags used for nesting. During field visits, approximately 2.0 variably-spaced snags per acre were observed in the project area, however snag diameters were generally too small (average 10.3" dbh) to be suitable for nesting flammulated owls. Vegetation plots within proposed harvest units did not locate any snags >11" dbh. Although their abundance was not captured in vegetation plots, some snags over 15" dbh were observed in the project area. Given the dense forested conditions and general lack of large, high-quality snags, habitat suitability for flammulated owls within the project area is low to moderate.

The CEAA contains approximately 1,298 acres (6.5% of project area) of potentially suitable flammulated owl habitat. Of these acres, approximately 982 acres (75.6% of available habitat) consist of preferred flammulated owl cover types on DNRC lands. Similar to the project area, the majority of these acres (>50%) on DNRC lands contain dense stocking and canopy levels not preferred by flammulated owls. Flammulated owls have not been recorded within the CEAA in the past (MNHP 2013). Suitable flammulated owl habitat within the CEAA is primarily limited by the presence of non-preferred cover types, dense forested conditions, and recent harvesting. Harvesting on 3,505 acres (60.5 of the CEAA) has created more open canopy habitat favored by flammulated owls, however it has also likely reduced the number and quality of snags available for nesting. Additionally, 22.6 miles of open road within the CEAA allow widespread access for firewood gathering, which likely further reduces the amount of available snags. Currently, habitat suitability for flammulated owls within the CEAA is low to moderate.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Flammulated Owls

None of the proposed forest management activities would occur. Timber harvest would not occur in flammulated owl habitat on lands in the project area. Thus, since there would be no change in availability or structure of preferred flammulated owl habitats, no direct or indirect effects to habitat suitability for flammulated owls would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Flammulated Owls

Timber harvest would occur on 140 of the 161 acres (86.6%) of suitable flammulated owl cover types available in the project area. The proposed activities would open stands to 5% to 15% canopy cover, improving stand structure suitability for flammulated owls in harvest units. Additionally, the proposed harvest prescription would favor leaving larger-diameter ponderosa pine and Douglas-fir, however trees and snags >18" dbh are generally absent from the project area (see MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY and SNAGS AND COARSE WOODY DEBRIS sections). Some snags could be removed by the proposed harvest, but at least 2 snags and 2 snag recruitment tree per acre (>21 inches dbh, or largest available) would be retained (ARM 36.11.411). Flammulated owls are tolerant of human disturbance (McCallum 1994), however disturbance associated with harvesting could temporarily displace flammulated owls should they be present in the project area. Flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. Approximately 5.5 miles of existing open road in the project area would be restricted; this would reduce some of the potential for snag loss due to firewood gathering in the future. Thus, minor beneficial direct and indirect effects to flammulated owl habitat suitability would be anticipated as a result

of the Action Alternative since: 1) no change in the availability of preferred flammulated owl habitat would occur, 2) proposed harvesting would alter 86.6% of existing suitable cover types; 3) changes in forest structure and cover type caused by harvesting would generally increase flammulated owl habitat suitability; and 4) the potential for nest snag loss due to firewood gathering would be reduced through the closure of 5.5 miles of open road.

Cumulative Effects of the No-Action Alternative on Flammulated Owls

None of the proposed forest management activities would occur. Flammulated owl habitat availability and structure would remain the same in the project area, but may change on some DNRC lands and other ownerships in the CEAA as a result of other projects. Past and ongoing forest management projects not associated with the proposed Lower McCully Timber Sale have affected flammulated owl habitat in the project area, and other proposed projects could alter flammulated owl habitat in the future (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Thus, since no additional change in the availability or structure of preferred flammulated owl habitats would occur, no cumulative effects to habitat suitability for flammulated owls would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Flammulated Owls

Timber harvest would occur on 140 of the 1,298 acres (10.8%) of potentially suitable flammulated owl habitat available in the project area. On DNRC lands, harvesting would affect 14.2% of the suitable flammulated cover types available. The proposed activities would open stands to 5% to 15% canopy cover, improving the suitability of stand structure for flammulated owls in harvest units. The proposed harvest prescription would favor leaving 10-20 trees per acre of larger-diameter ponderosa pine, western larch, and Douglas-fir. Some snags could be removed by the proposed harvest, but at least 2 snag and 2 snag recruitment trees per acre (>21 inches dbh, or largest available) would be retained (*ARM* 36.11.411). Flammulated owls are tolerant of human disturbance (*McCallum 1994*), however disturbance associated with harvesting could temporarily displace flammulated owls should they be present in the project area. Flammulated owls would not be displaced by activities occurring in the winter months when the birds have migrated to their winter range. Thus, minor beneficial direct and indirect effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative since: 1) no change in the availability of preferred flammulated owl habitats would occur, 2) harvesting would alter approximately 10.8% of potentially suitable habitat, and 3) changes in structure and cover type within harvest units would generally increase flammulated owl habitat suitability.

GRAY WOLF

Issue: The proposed activities could displace gray wolves from the vicinity of the project area, particularly denning and rendezvous sites, and/or alter big game prey availability, which could adversely affect gray wolves.

Introduction

In April 2011, gray wolves were removed from the federal list of threatened and endangered species in Montana, Idaho and parts of Washington, Oregon, and Utah. DNRC currently considers them as a sensitive species for the purpose of analyzing impacts associated with forest management activities. Wolves are wide-ranging opportunistic carnivores that prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwest Montana (Kunkel et al. 2004). In general, wolf densities are positively correlated to prey densities (Oakleaf et al. 2006, Fuller et al. 1992). Some studies have shown that wolves may prey upon elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (Arjo et al. 2002, Kunkel et al. 2004, Garrott et al. 2006). Thus, reductions in big game numbers and/or winter range productivity could indirectly be unfavorable to wolves.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves start leaving their pups at rendezvous sites while hunting. These sites are used

throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. Cumulative effects were analyzed on a 48,455-acre CEAA around the project area (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale approximates an area large enough to support a wolf pack in northwest Montana (based upon DFWP wolf pack home range data, 2010-2013).

Analysis Methods

Since changes in big game distribution could have an effect on availability of prey for wolves, portions of this analysis tie to the big game winter range section below. Direct, indirect, and cumulative effects were analyzed using field evaluations, DFWP wildlife data, aerial photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of big game winter range modified and level of human disturbance in relation to any known wolf dens or rendezvous sites.

Existing Conditions

The proposed project area is periodically within the annual home range of the Chippy wolf pack. No denning or rendezvous sites are known or have been recorded in the project area (Kent Laudon, DFWP, personal comm. 2013). However, landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, are present within the project area. Thus, current or future presence of wolves in the vicinity of the project area is likely.

In northwest Montana, wolves and habitats they use generally mirror those of their ungulate prey - primarily white-tailed deer, moose, and elk. The proposed project area contains summer habitat for the aforementioned prey species, as well as 640 acres of winter range habitat for white-tailed deer, elk, and moose (see WILDLIFE – BIG GAME HABITAT). Signs of use by deer in the summer were observed during field visits. The proposed project area contains 7.1 miles of open roads and 0.2 miles of restricted roads (total road density 7.3 miles/sq mile) that could serve as a source of disturbance and mortality for both wolves and big game (see TABLE W-4– ROAD MANAGEMENT AND CONSTRUCTION). Within the larger CEAA, winter range for white-tailed deer (77.6% of CEAA) and elk (88.1%) is relatively abundant, while moose (63.7%) and mule deer (0%) winter range is more limited. Landscape features commonly associated with denning and rendezvous sites, including meadows, and openings near water, and gentle terrain, occur within the CEAA. Past harvesting on all ownerships in the CEAA has altered forest cover on 26,927 acres (55.6% of CEAA), which could influence use of the area by big game. Harvesting has reduced the amount of mature forest within the CEAA, reducing the amount of thermal cover and snow intercept available to big game. Current and proposed harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) could continue to alter big game habitat and indirectly influence wolves. However, the CEAA contains 10,713 acres (22.1%) of mature forest that likely provide cover for big game and important thermal cover/snow intercept characteristics. The CEAA contains an extensive network of restricted and open roads (total road density 5.4 miles/sq mile), which has increased human access and the potential for wolf-human interactions. Increasing access to these areas can elevate risk of wolf/human encounters and elevate the vulnerability of their ungulate prey, especially during the hunting and trapping seasons. A small number of human dwellings mainly situated near the Thompson River pose additional risk for wolves. Livestock operations on private and federal lands likely pose the greatest risk to wolves within the CEAA due to the heightened potential for associated conflicts and resulting management actions. Big game habitat within CEAA remains largely intact and undeveloped; thus, continued wolf use of the area is expected.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Gray Wolves

No timber harvesting or associated activities would occur under the no-action alternative. Thus, since: 1) no additional changes in human disturbance levels would occur; and 2) no changes to the vegetation on big game winter ranges would occur, no direct and indirect effects would be expected to affect gray wolf displacement risk, or big game prey availability that could subsequently affect wolves.

Direct and Indirect Effects of the Action Alternative on Gray Wolves

Wolves using the area could be temporarily disturbed by harvesting activities; however, they are most sensitive at den and rendezvous sites, which are not known to occur within the project area. In the short term (approximately 1-3 years), activities associated with the proposed harvest could displace wolves and big game, should they be present in the area. Additionally, the resulting open stand conditions could increase the probability of a wolf or big game animal being observed and harvested during future hunting seasons. Existing scattered, dense patches of regenerating trees 5-25 feet tall would be retained where feasible, which would reduce sight distances for hunters looking for wolves or big game. Approximately 0.2 miles of restricted roads would be used for harvest activities for no more than three consecutive years. During this period, a total of 7.9 miles of open, temporary and restricted roads would be used to conduct project activities. Following harvest, all newly constructed roads and approximately 5.5 miles of existing open road would be closed to motorized use by the public. Temporary roads and unused restricted roads would be reclaimed following use associated with the project. After timber harvesting, motorized disturbance levels would be expected to be reduced, as open road density would decrease from 7.3 miles/sq. mile to 1.6 miles/sq. mile (see TABLE W-4— ROAD MANAGEMENT AND CONSTRUCTION). Potential for any use of the project area by wolves for denning and rendezvous sites would likely revert to pre-harvest levels following operations. Harvest would result in the reduction of thermal cover on 604 acres (94.4% of project area) of big game winter range within the project area. These reductions in cover on big game winter range could result in minor shifts in prey availability for wolves. Additional impacts to big game winter range are discussed in more detail in the WILDLIFE – BIG GAME HABITAT section of this wildlife analysis. Thus, minor adverse direct and indirect effects to wolf prey availability and minor adverse direct and indirect effects associated with gray wolf displacement risk would be expected since: 1) no known wolf den and/or rendezvous sites are within 1 mile of the project area, 2) there would be reductions in habitat quality of big game winter range that could alter wolf prey availability in the immediate area, and 3) there would be short-term increases in motorized disturbance but a substantial reduction in long-term public motorized use of the project area.

Cumulative Effects of the No-Action Alternative on Gray Wolves

No additional disturbance of gray wolves, their prey, or their habitat would occur under this alternative as no timber harvesting activities would occur. Past and ongoing forest management projects not associated with the proposed Lower McCully Timber Sale have affected wolf prey availability in the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS), and other proposed projects could displace wolves and/or alter wolf prey availability in the future. Activities associated with the Thompson Face Timber Sale could continue altering big game winter range habitat and create disturbance within the CEAA. No additional cumulative effects to wolves associated with displacement or prey availability would be expected to result from the No-Action Alternative within the CEAA.

Cumulative Effects of the Action Alternative on Gray Wolves

In the CEAA, temporary displacement of big game and wolves is possible, should they occur in the area within close proximity to proposed timber harvest and hauling activities. Disturbance associated with the Action Alternative would be additive to ongoing and proposed forest management activities within the CEAA (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Reductions in cover may cause moderate decreases in use by deer, moose, and elk in the immediate area; however, appreciative changes in deer and elk distribution or abundance would not be expected at the scale of the CEAA (see WILDLIFE – BIG GAME HABITAT). Cover would be reduced on 604 acres (1.3% of CEAA) of big game winter range within the CEAA. Reductions in cover would be additive to 26,928 acres (55.6% of CEAA)

of past timber-harvesting activities within the last 40 years in the CEAA. The reductions that would occur under this alternative to big game winter range would not be expected to affect the overall potential for use of the CEAA by wolves. In addition to the 7.9 miles of potential road use within the project area, approximately 1.6 miles of open road would receive appreciable increased traffic within the CEAA. Under this alternative, motorized disturbance associated with harvest activities would increase for up to 3 years, however public motorized use would be restricted on some roads during harvesting. All temporary roads and new restricted roads used to conduct project-related work would be closed to motorized public use during harvest and following completion of harvest activities. Additionally, 5.5 miles of existing open road would be closed to public motorized vehicles after harvest, therefore reducing some associated hunting mortality risk to wolves and big game. Other minor risks within the CEAA, such as livestock grazing, would continue to pose risks to wolves in this area because of the potential for conflicts and resulting management actions. No substantive change in long-term potential for wolf use of the CEAA would be expected. Thus, minor adverse cumulative effects to gray wolf displacement risk and changes to big game prey availability would be expected under the Action Alternative since: 1) localized, temporary disturbance and displacement could occur due to logging activities in the area for up to 3 years; 2) winter range habitat quality would be reduced on 1.3% of the CEAA, however the proposed activities are not expected to adversely affect overall prey availability for wolves; and 3) there would be a long-term decrease in public motorized access.

PILEATED WOODPECKER

Issue: The proposed activities could negatively affect pileated woodpecker habitat suitability by removing canopy cover and snags used for foraging and nesting, and by creating disturbance.

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags (Bull et al. 1997). Aney and McClelland (1985) described pileated nesting habitat as...“stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy.” Necessary feeding and nesting habitat attributes, include large snags, large decayed trees, and downed wood, which closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979).

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. For cumulative effects, the project area and sections immediately surrounding the project area were used to define the small CEAA, which comprises 5,792 total acres of DNRC and non-DNRC lands (see TABLE W-1 – WILDLIFE ANALYSIS AREAS and FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale includes sufficient area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (Bull and Jackson 1995).

Analysis Methods

Analysis methods include field evaluation, aerial photograph interpretation, and GIS analysis of available habitats. SLI data were used to identify preferred pileated woodpecker habitat (ARM 36.11.403(58)). Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and mapped potential habitat. For this analysis on DNRC-managed lands in the CEAA, sawtimber stands ≥ 100 years old within preferred pileated cover types (ARM 36.11.403(58)) with 40 percent or greater canopy closure were considered potential pileated woodpecker habitat. Cumulative effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial photograph interpretation of potential habitat on all other lands within the CEAA. Potential suitable pileated woodpecker habitat on non-DNRC lands was considered to be mature forest

with ≥40% crown closure. Factors considered include the amount of potential pileated woodpecker habitat, degree of harvesting, and the amount of continuous mature forested habitat suitable for use by pileated woodpeckers.

Existing Conditions

In the project area, there are approximately 535 acres (83.6% of project area) of potential pileated woodpecker habitat. Current potential pileated habitat within the project area consists of mature Douglas-fir/western larch, ponderosa pine, and mixed conifer stands that function as a single patch. This single patch is part of a larger suitable pileated habitat patch including lands outside of the project area. Disturbance, primarily in the form of timber harvest, has resulted in an abundance of young stands and cover types not suitable for pileated woodpeckers. Snags and coarse woody debris within the proposed project area are at the lower end of levels generally appropriate for the existing habitat types (see SNAGS AND COARSE WOODY DEBRIS). Average snag size is too small for pileated nesting and few large snags (>15" dbh) were observed. However, some potential pileated woodpecker foraging evidence was observed during field visits. Past harvesting has altered mature stands, snags, and coarse woody debris throughout the project area. Firewood gathering, which can result in a reduction of snags and downed logs valuable as woodpecker nesting and foraging substrates, is likely widespread within the project area due 7.2 miles of open roads and numerous roads on surrounding private land. Given these observed existing habitat conditions, pileated woodpecker habitat suitability is currently low to moderate within the project area.

The small CEAA contains approximately 1,219 acres (20.1% of the CEAA) of potential pileated woodpecker habitat on DNRC-managed lands. Another 288 acres (5.0% of the CEAA) of additional mature forest within the CEAA provides potentially suitable habitat conditions for pileated woodpeckers. Together, these 1,507 acres (26.0% of CEAA) are distributed among 22 patches and average patch size is 69 acres (range 1-1,041 acres). Pileated woodpecker habitat within the project area is part of a larger 1,041-acre patch in the CEAA (18.0% of the CEAA). Presently, 2.6 percent (149 acres) of the CEAA not forested and is not suitable for use by pileated woodpeckers. These non-forested areas include: meadows, lakes, and roads. Most of the remaining 4,136 acres (71.4%) within the CEAA consist of young, forested stands or less preferred cover types that are not likely providing suitable habitat for pileated woodpeckers. Firewood gathering is active along 22.6 miles of open road within the CEAA. Thus, habitat quality and availability for pileated woodpeckers within the CEAA is currently low to moderate.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers

No timber harvesting activities would occur under this alternative. Thus, no adverse direct and indirect effects associated with disturbance levels or habitat suitability for pileated woodpeckers in the project area would be expected since: 1) no changes in the amount of continuously forested habitat would be anticipated, 2) no changes to existing pileated woodpecker habitat would be anticipated, and 3) no additional disturbance would take place.

Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers

Harvesting in suitable pileated woodpecker habitat within the project area would reduce forested habitat for pileated woodpeckers and create younger-aged stands with widely scattered mature trees. Approximately 500 acres (93.5%) of available pileated woodpecker habitat in the project area would be altered with regeneration-type treatments and would likely be too open to be suitable habitat following logging. Approximately 35 acres (6.5%) of currently suitable pileated habitat would remain unharvested within the project area. In the stands proposed for treatment, suitable pileated habitat would be removed for 50-80 years. Snags important for nesting pileated woodpeckers would be retained in the proposed harvest areas (see SNAGS AND COARSE WOODY DEBRIS), however the abundance of snags and snag recruitment trees would be reduced. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979), pileated woodpecker habitat quality

in the project area would be expected to be reduced on 500 acres. Overall patch size of contiguous pileated habitat in the project area would decrease from 535 acres to an average of 13 acres (largest 13 acres). The resulting two unharvested pileated habitat patches within the project area would remain connected to suitable habitat patches outside of the project area. Silvicultural prescriptions in harvest units would retain healthy ponderosa pine, western larch and Douglas-fir trees in low densities (10-20 per acre), while promoting the regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing high-quality nesting, roosting, and foraging habitat. Low-quality habitat associated shade-tolerant tree species would likely be converted to a more desirable forest type, although it would take about 50-80 years to mature into pileated habitat. Pileated woodpeckers tend to be tolerant of human-caused disturbance (Bull and Jackson 1995), but they could be temporarily displaced by the noise and activity associated with the proposed harvesting. Approximately 5.5 miles of open road would be closed to public motorized use following harvest activities, which would reduce the risk of snag and coarse woody debris loss due to firewood gathering. Thus, moderate adverse direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area since: 1) 93.5% of available suitable habitat within the project area would be harvested; 2) the amount of contiguous suitable pileated woodpecker habitat would be reduced by 500 acres; 3) baseline habitat suitability appears to be low to moderate for pileated woodpeckers due to past harvesting and low abundance of snags/coarse woody debris; 4) some snags and snag recruits would be removed, however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre (of the largest size classes available) in harvest areas would be included; 5) harvest prescriptions would retain and promote seral tree species in all proposed harvest areas; and 6) temporary levels of potential disturbance would increase over a 1-3 year period, but long-term disturbance would decrease.

Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers

No timber harvesting activities would occur under this alternative. Past and ongoing forest management projects not associated with the proposed Lower McCully Timber Sale have affected pileated woodpecker habitat in the project area, and other proposed projects could disturb pileated woodpecker and/or alter habitat suitability in the future (TABLE W-2 – RECENT AND PROPOSED PROJECTS). No additional cumulative effects to pileated woodpeckers associated with disturbance risk or habitat suitability are expected to result from the No-Action Alternative that could affect pileated woodpeckers in the CEAA since: 1) no changes in the amount of continuously forested habitat would be anticipated, 2) no changes to existing pileated woodpecker habitat would be anticipated, and 3) no additional disturbance would take place.

Cumulative Effects of the Action Alternative on Pileated Woodpeckers

Under this alternative, pileated woodpecker habitat would be reduced on 500 acres (33.2%) of the 1,507 acres of potentially suitable habitat in the CEAA. Forest canopy on the 500 acres of treated area would likely be too open for appreciable use by pileated woodpeckers, and would be more similar to other recently harvested stands that comprise 3,505 acres (60.5%) of the CEAA. The number of habitat patches would increase from 22 to 26 and average patch size would decrease from 69 acres to 39 acres (range 1-416 acres). Harvesting would reduce the largest existing 1,041-acre patch in the CEAA (18.0% of the CEAA) to 416 acres (7.2% of the CEAA). Snags, coarse woody debris, and potential nesting trees would be retained in the project area according to forest management *ARM 36.11.41*; however, snags and snag recruitment trees would be reduced from existing levels in all of the proposed harvest units. Recent harvesting in the CEAA has altered the quality and abundance of pileated woodpecker habitat; reductions associated with this action alternative would be additive to those reductions. Overall habitat suitability of the CEAA to pileated woodpeckers would be expected to decrease for 30-50 years until harvested stands from the last 20-30 years mature. Firewood gathering along open roads would continue to limit the abundance of snags and woody debris within areas of the CEAA, however the closure of 5.5 miles of existing open road would reduce this risk in the project area. In the long term, maturation of stands across the CEAA would increase suitable pileated woodpecker habitats through time. Thus, moderate cumulative effects to habitat suitability for pileated woodpeckers would be anticipated since: 1) 33.2% of suitable pileated woodpecker habitat currently present within the CEAA would be altered; 2) the existing baseline level of pileated woodpecker habitat suitability is low to moderate; 3) average patch size

of suitable habitat would be reduced by 30 acres; 4) some snags and snag recruits per acre would be removed in the proposed harvest areas for operational and human safety purposes, however, mitigation measures would retain at least 2 large snags and 2 large recruitment trees in harvested areas; and 5) disturbance and firewood gathering would be reduced in the long-term with proposed restrictions on access.

BIG GAME HABITAT

Issue: The proposed activities could reduce habitat quality for big game, especially during the fall hunting and winter seasons, by removing forest cover, disturbing animals, and increasing roads in secure areas.

Introduction

Timber harvesting can affect big game and habitat quality through disturbance during harvest activities, removal of forest crown closure, and by creating openings in the forest used for foraging. Forested habitat on winter ranges enables big game survival by ameliorating the effects of severe winter weather conditions. Winter ranges tend to be areas found at lower elevations that support concentrations of big game, which are widely distributed during the remainder of the year. Suitable winter ranges have adequate midstory and overstory cover that reduces wind velocity and intercepts snow, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose.

Timber harvesting can increase big game (e.g. elk) vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during times of hunting pressure (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and resulting decrease in hunter opportunity.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 640-acre project area. Cumulative effects were analyzed on 48,455-acre large CEAA (see FIGURE W-1 – WILDLIFE ANALYSIS AREAS). This scale of analysis is defined according to geographic features including watershed boundaries (i.e. ridgelines, wildfire boundaries), which provides a reasonable biological analysis unit for big game animals that could be influenced by project-related activities.

Analysis Methods

To assess big game habitat on the project area, SLI data were used to identify stands with cover types and forest structure (≥ 40 crown closure) that could provide thermal and/or hiding cover for big game species. Cumulative effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial photograph interpretation of potential habitat on all other lands within the CEAA. Potential thermal and/or hiding cover habitat on non-DNRC lands was considered to be mature forest with $\geq 40\%$ crown closure. Direct, indirect, and cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats. Factors considered in the analysis include the amount of big game winter range habitat available, the extent of past and proposed harvesting, and level of human access for recreational hunting.

Existing Environment

The entire proposed project area (640 acres) has been identified by DFWP as white-tailed deer, moose and elk winter range. Evidence of summer/fall deer use was observed during field visits to the project area. The project area contains approximately 575 acres (89.9%) of habitat that is currently providing year-round cover and visual screening for big game. These acres also provide moderate to high amounts of thermal cover and snow intercept for wintering big game. An additional 65 acres (10.2%) of the project area have forested stands that contain a more open overstory canopy ($< 40\%$ canopy cover) than what would be considered high-quality thermal cover or cover that would provide appreciable snow intercept. Due to past harvesting within the project area, small dense patches of mature trees less than 2 acres in size are interspersed within most of the area and could be providing marginal levels of thermal cover/snow intercept. High levels of hunter access exist in the project area, as there are 7.1 miles of

open roads spread throughout the area. The density of open roads in the project area is 7.1 miles/sq. mile. The project area likely receives its highest amount of use during the fall hunting season.

White-tailed deer winter range occupies approximately 37,618 acres (77.6%) of the CEAA. Approximately 30,845 (63.7%) and 42,688 acres (88.1%) of the CEAA were identified as moose and elk winter range, respectively. Big game winter ranges within the CEAA are connected to a much larger winter range area (>500,000 acres) extending north along US Highway 2 and south along US Highway 200. Presently, approximately 10,713 acres (22.1%) within the CEAA are providing usable thermal cover and snow intercept for big game. These forest patches are currently distributed primarily on DNRC and Forest Service lands within the CEAA, as extensive harvesting on private industrial timberlands has reduced these attributes. In the last 40 years, harvesting has reduced thermal cover and snow intercept on winter range within the CEAA. These recent harvests have reduced the quality and quantity of usable cover on winter range within the area, but they may have increased forage quality and quantity by opening up the forest overstory canopy. However, forage occurring in forest openings is often not available to wintering animals during appreciable portions of the winter due to deep, crusted snow conditions. Encroachment of noxious weeds into recently logged areas has also likely offset some of the potential gain in forage production. Additionally, approximately 6,998 acres (14.4%) of the CEAA underwent stand-replacement wildfire during the Chippy Creek Fire in 2007. These burned stands are not providing sufficient winter cover for big game. Ongoing and future harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS), could continue to reduce cover attributes on winter range and temporarily displace big game within the CEAA. The CEAA also likely receives moderate levels of hunter access, especially in areas where roads, both open and restricted, are more numerous. Open road density within the CEAA is 3.0 miles/sq. mile and total road density is 5.4 miles/sq. mile.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Big Game Habitat

No changes in big game habitat would be expected as no timber harvesting activities would occur. Existing cover would continue to contribute to winter range quality and security habitat would not be altered. Thus, no direct or indirect effects to big game habitat in the project area would be anticipated since: 1) no changes to existing thermal cover would be anticipated and continued maturation of forest cover would improve thermal cover and snow intercept, and 2) the level of human access would remain unchanged.

Direct and Indirect Effects of the Action Alternative on Big Game Habitat

Under the action alternative, approximately 604 acres (94.4% of project area) of big game habitat and winter range would be harvested on the project area. Of these acres, roughly 553 acres of mature canopy forest currently providing thermal cover would be harvested. Harvest prescriptions in all harvest units would result in areas too open to effectively function as thermal cover or snow intercept. Retention of scattered, dense patches of regenerating conifers could provide marginal levels of thermal cover/snow intercept. Forest vegetation capable of providing these big game habitat attributes would require 40-60 years for suitable sized trees (>40 ft. tall) to develop in harvested stands.

Proposed tree removal would increase sight distances in harvest units and could increase risk of hunting mortality for 10-20 years. Rolling topography and the retention of scattered patches of regenerating conifers 5-20 feet tall within harvest units would help mitigate some loss of big game security. Some short-term (1-3 years) displacement of big game would be expected as a result of the proposed motorized logging disturbance. Road density and use within the project area would see a temporary increase (TABLE W-4 – ROAD MANAGEMENT AND CONSTRUCTION). During all phases of the project, any restricted roads and new road construction opened with project activities would be restricted from motorized-use by the general public and closed after completion of project activities. Long-term open road density would decrease from 7.1 miles/sq. mile to 1.6 miles/sq. mile.

Thus, moderate adverse direct and indirect effects to big game security habitat and winter range habitat quality would be expected for the next 40 to 60 years since: 1) a high percentage of available effective thermal cover/snow intercept (96.2%) in the project area would be removed; 2) lesser amounts of unaltered winter range (36 acres) and thermal/cover (22 acres) would remain; 3) sight distances would

increase on 604 acres, which could increase big game vulnerability and associated hunting mortality risk; 4) reduced motorized hunter access, rolling topography, and retained patches of regenerating conifers would mitigate some of the adverse effects of mature cover removal; 5) relatively short-term logging activities would create disturbance in this area; and 6) long-term open road density would be reduced by 5.5 miles/sq. mile.

Cumulative Effects of the No-Action Alternative on Big Game Habitat

No additional changes in big game habitat would be expected as no timber harvesting activities would occur. Existing levels of cover would persist. Past and ongoing forest management projects not associated with the proposed Lower McCully Timber Sale (see TABLE W-2 – RECENT AND PROPOSED PROJECTS) have affected big game habitat in the project area, and other proposed projects could disturb big game species and/or alter habitat quality in the future. Activities associated with the Thompson Face Timber Sale could continue altering big game winter range habitat and create disturbance within the CEAA. No additional cumulative effects to big game habitat quality are expected to result from the No-Action Alternative that could affect big game species in the CEAA since: 1) no big game habitat would be altered and continued maturation of forest cover would improve thermal cover and snow intercept, and 2) the level of human access would remain unchanged.

Cumulative Effects of the Action Alternative on Big Game Habitat

Forest stands providing suitable thermal cover and snow intercept would be removed from approximately 553 acres (1.1%) of winter range within the CEAA (48,455 acres). This reduction thermal cover and snow intercept would be additive to past reductions within the CEAA due to forest management and wildfire. Advanced dense patches of regenerating conifers (>6 feet height) and some canopy cover (5-15%) would be retained, providing some residual cover. A minor decrease in big game habitat quality on winter range within the CEAA would be expected, however only a small portion (<1%) of the larger winter range area falls within the CEAA. Reductions in cover may cause moderate decreases in use by deer, moose, and elk in the immediate area; however, appreciative changes in deer and elk distribution or abundance would not be expected at the scale of the CEAA. Continued maturation of previously harvested stands within the CEAA would improve thermal cover/snow intercept and partially offset these current losses within 20 to 40 years.

Harvesting and motorized disturbance within the CEAA associated with the proposed project could displace wintering big game and reduce available winter range habitats. Displacement associated with this alternative would be additive to any displacement associated with ongoing timber harvesting (see TABLE W-2 – RECENT AND PROPOSED PROJECTS). Under the action alternative, use of existing roads and new roads constructed for completing harvesting activities could temporarily increase access and disturbance on 7.9 miles and result in a temporary increase in open road density from 3.02 miles/sq. mile to 3.03 miles/sq. mile. After harvesting, open road density would be reduced within the CEAA by 0.1 miles/sq. mile, however an extensive network of roads would continue to facilitate high amounts of hunter access.

Thus, minor adverse cumulative effects to big game winter range and elk security habitat would be expected since: 1) harvesting would reduce overall levels of cover on 553 acres (1.1%) of winter range within the CEAA; 2) existing thermal cover and snow intercept on winter range in the CEAA would be altered, but approximately 10,160 acres of these attributes would remain; 3) some canopy cover and regenerating conifer patches would remain; 4) overall habitat quality within the larger winter range would not be appreciably altered; 5) logging activities would create additional disturbance on approximately 2% of the CEAA; and 6) long-term open road densities would be slightly reduced.

Wildlife Mitigations associated with the Action Alternative

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (*ARM 36.11.428 through 36.11.435*).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per *ARM 36.11.444(2)* and *GB-PR2 (USFWS AND DNRC 2010, Vol. II p. 2-5)*.

- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (*USFWS AND DNRC 2010, Vol. II p. 2-6*).
- Public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- In a portion of harvest units, retain patches of advanced regeneration of shade-tolerant trees as per LY-HB4 (*USFWS AND DNRC 2010, Vol. II pp. 2-50, 2-51*).
- Retain at least 2 snags per acre and 10-20 tons of coarse woody debris per acre. Emphasize the retention of downed logs ≥ 15 inches dbh where they occur as per LY-HB2(1) and (2) (*USFWS AND DNRC 2010, Vol. II p. 2-48*). Favor ponderosa pine, western larch and Douglas-fir for snag retention and recruitment.
- Close roads and trails to the extent possible following the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.

Literature Cited:

- Aney, W. and R. McClelland. 1985. Pileated Woodpecker Habitat Relationships (revised). Pages 10-17 in Warren, N. eds. 1990. Old Growth Habitats and Associated Wildlife Species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47pp.
- Arjo, W. M., D. H. Pletscher, and R. R. Ream. 2002. Dietary Overlap between Wolves and Coyotes in Northwestern Montana. *Journal of Mammalogy* 83:754-766.
- Bull, E. L., and J. A. Jackson. 1995. Pileated woodpecker: *Dryocopus pileatus*. American Ornithologists' Union. Washington DC. 24pp.
- Bull, E.L., C. G. Parks, and T. R. Torgersen. 1997. Trees and Logs Important to Wildlife in the Interior Columbia River Basin. General Technical report PNW-391. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. 55pp.
- Buskirk, S.W., and R.A. Powell. 1994. Habitat ecology of fishers and American martens. Pages 283-296 in Buskirk, S.W., A. Harestad, M. Raphael, eds. Biology and conservation of martens, sables and fishers. Cornell University Press, Ithaca, NY.
- DFWP 2008. Maps of moose, elk, mule deer, and white-tailed deer distribution in Montana. Individual GIS data layers. August 12, 2008. Montana Fish, Wildlife and Parks. Helena, MT.
<http://fwp.mt.gov/gisData/imageFiles/distributionElk.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionMoose.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionMuleDeer.jpg>.
<http://fwp.mt.gov/gisData/imageFiles/distributionWhiteTailedDeer.jpg>
- DNRC 2010. DNRC Canada lynx habitat mapping protocols for implementation of the HCP. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan Final EIS. September 2010. Vol. II, Appendix B, pp. B-5 to B-19.
- Fischer, W.C., and A.F. Bradley. 1987. Fire ecology of western Montana forest habitat types. USDA Forest Service, General Technical Report INT-223. 95pp.
- Foresman, K.R.. 2012. Mammals of Montana. Second Edition. Mountain Press Publishing Co., Missoula, MT. 429pp.

- Fuller, T. K., W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A History and Current Estimate of Wolf Distribution and Numbers in Minnesota. *Wildlife Society Bulletin* 20:42-55.
- Garrott, R., S. Creel, and K. Hamlin. 2006. Monitoring and Assessment of Wolf-Ungulate Interactions and Population Trends within the Greater Yellowstone Area, SW Montana and Montana Statewide. Unpublished report at: <http://www.homepage.montana.edu/~rgarrott/wolfungulate/index.htm>
- Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D. S. Page-Dumroese. 1994. *Managing Coarse Woody Debris in Forest of the Rocky Mountains*. USDA Forest Service Research Paper. INT-RP-447. 13pp.
- Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old Growth Forest Types of the Northern Region. R-1 SES. USDA Forest Service, Northern Region, Missoula MT 60pp.
- Harris, R.B. 1999. Abundance and Characteristics of Snags in Western Montana Forests. General Technical report RMRS-GTR-31. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT. 19pp.
- Hejl, S. J. and R. E. Woods. 1991. Bird assemblages in old-growth and rotation-aged Douglas-fir/ponderosa pine stands in the Northern Rocky Mountains: a preliminary assessment. Pages 93-100 in D. M. Baumgartner and J. E. Lotan, eds. *Proc. Symposium: Interior Douglas-fir: the species and its management*. Washington State University, Pullman, WA. 306pp.
- Heinemeyer, K. S., and J. L. Jones. 1994. Fisher biology and management in the western United States: A literature review and adaptive management strategy. USDA Forest Service, Northern Region, Missoula, Montana. 108pp.
- Johnson, S. 1984. Home range, movements, and habitat use of fishers in Wisconsin. M.S. Thesis, University Wisconsin, Stevens Point. 78pp.
- Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147 pp.
- Kasworm, W. F., H. Carriles, T. G. Radandt, M. Proctor, and C. Servheen. 2011. Cabinet-Yaak grizzly bear recovery area 2009 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 86 pp.
- Kunkel, K.E., D.H. Pletscher, D.K. Boyd, R.R. Ream, and M.W. Fairchild. 2004. Factors Correlated with Foraging Behavior of Wolves in and near Glacier National Park, Montana. *Journal of Wildlife Management* 68(1): 167-178.
- Losensky, J.B. 1997. Historical vegetation of Montana. Prepared for DNRC. Unpublished report on file at DNRC Forest Management Bureau, Missoula, MT. 100 pp.
- McCallum, A.D. 1994. Flammulated Owl (*Otus flammeolus*). In: A. Poole and F. Gill, eds., *The Birds of North America*, No.93. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC., pp. 24.
- McClelland, B.R. 1979. The pileated woodpecker in forests of the Northern Rocky Mountains. Pages 283-299 in *Role of insectivorous birds in forest ecosystems*. Academic Press.
- Oakleaf, J.K., D. L. Murray, J. R. Oakleaf, E. E. Bangs, C. M. Mack, D. W. Smith, J. A. Fontaine, M. D. Jimenez, T. J. Meier, and C. C. Niemeyer. 2006. Habitat Selection by Recolonizing Wolves in the Northern Rocky Mountains of the United States. *Journal of Wildlife Management* 70:554-563.

- MNHP. 2013. Tracker data. Montana Natural Heritage Program online database query for the Lower McCully Timber Sale project area. <http://mtnhp.org/Tracker/NHTMap.aspx>
- Parks, C.G. and D.C. Shaw. 1996. Death and decay: A vital part of living canopies. Northwest science. Vol. 70, special issue: 46-53.
- Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest habitat types of Montana. USDA For. Serv. Gen. Tech. Rep. INT-34. Intermountain Forest and Range Experiment Station Ogden, Utah. 174pp.
- Powell, R. 1982. The fisher: National history, ecology, and behavior. University of Minnesota Press, Minneapolis, Minnesota. 217pp.
- Ruggiero, L. F., Aubry, K. B., Buskirk, S. W., Koehler, G. M., Krebs, C. J., McKelvey, K. S., and J. R. Squires. 1999. Ecology and conservation of lynx in the United States. General Technical Report RMRS-GTR-30WWW. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Fort Collins, CO. 473 pp.
- Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT. 122 pp.
- Squires, J.R., N.J. DeCesare, J.A. Kolbe, and L. F. Ruggiero. 2010. Seasonal resource selection of Canada lynx in managed forests of the Northern Rocky Mountains. Journal of Wildlife Management 74:1648-1660.
- USFWS and DNRC. 2010. Montana Department of Natural Resources and Conservation Forested Trust Lands Habitat Conservation Plan, Final Environmental Impact Statement, Volumes I and II. U.S. Department of Interior, Fish and Wildlife Service, Region 6, Denver, Colorado, and Montana Department of Natural Resources and Conservation, Missoula, MT. September 2010.
- USFWS. 1993. Grizzly Bear Recovery Plan. Missoula MT. 181pp.
- Wittinger, W.T. 2002. Grizzly bear distribution outside of recovery zones. Unpublished memorandum on file at USDA Forest Service, Region 1. Missoula, Montana. 2pp.

FIGURE W-1 – WILDLIFE ANALYSIS AREAS. Areas used to assess effects of the action and no-action alternatives on wildlife and wildlife habitat for the proposed DNRC Lower McCully Timber Sale.

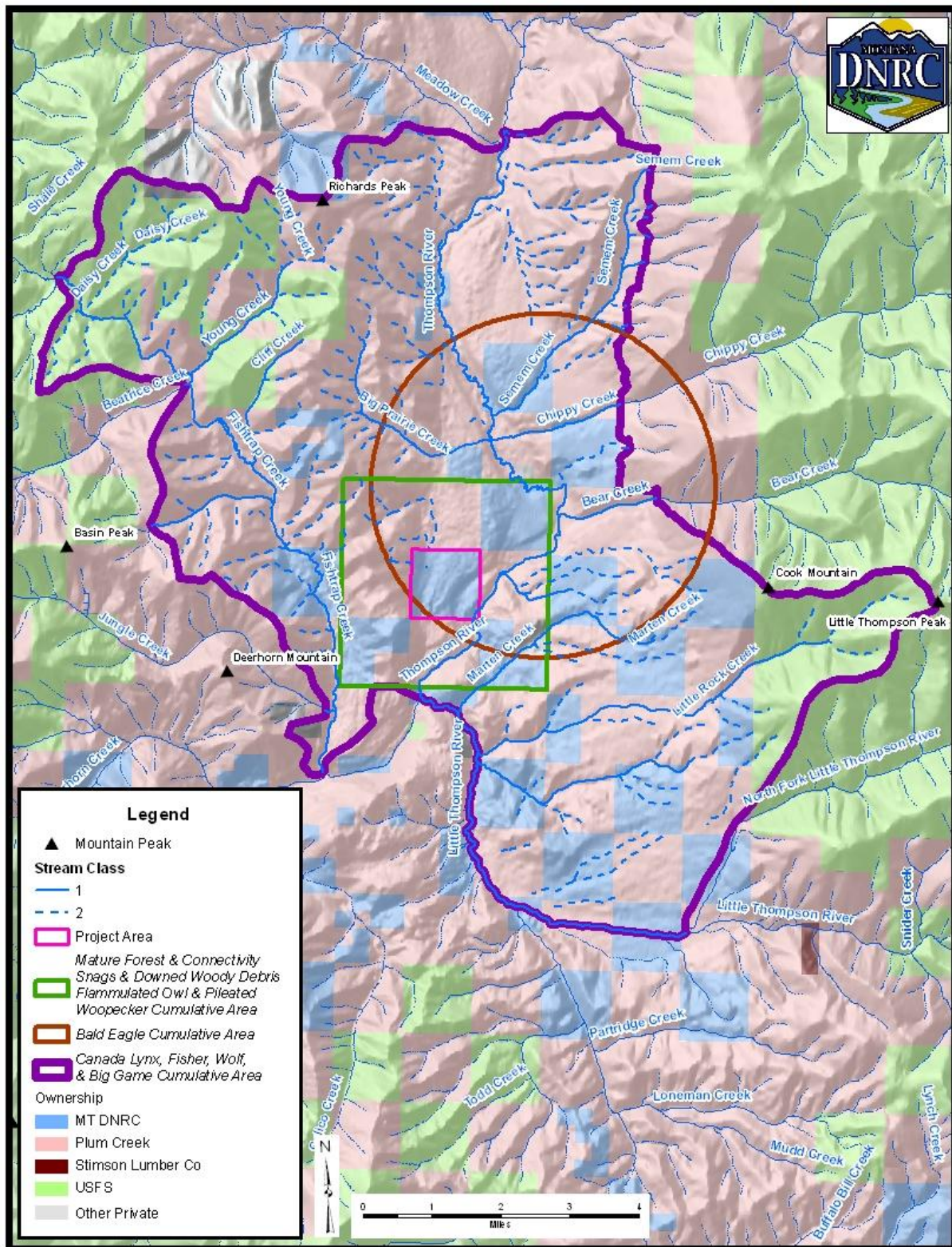
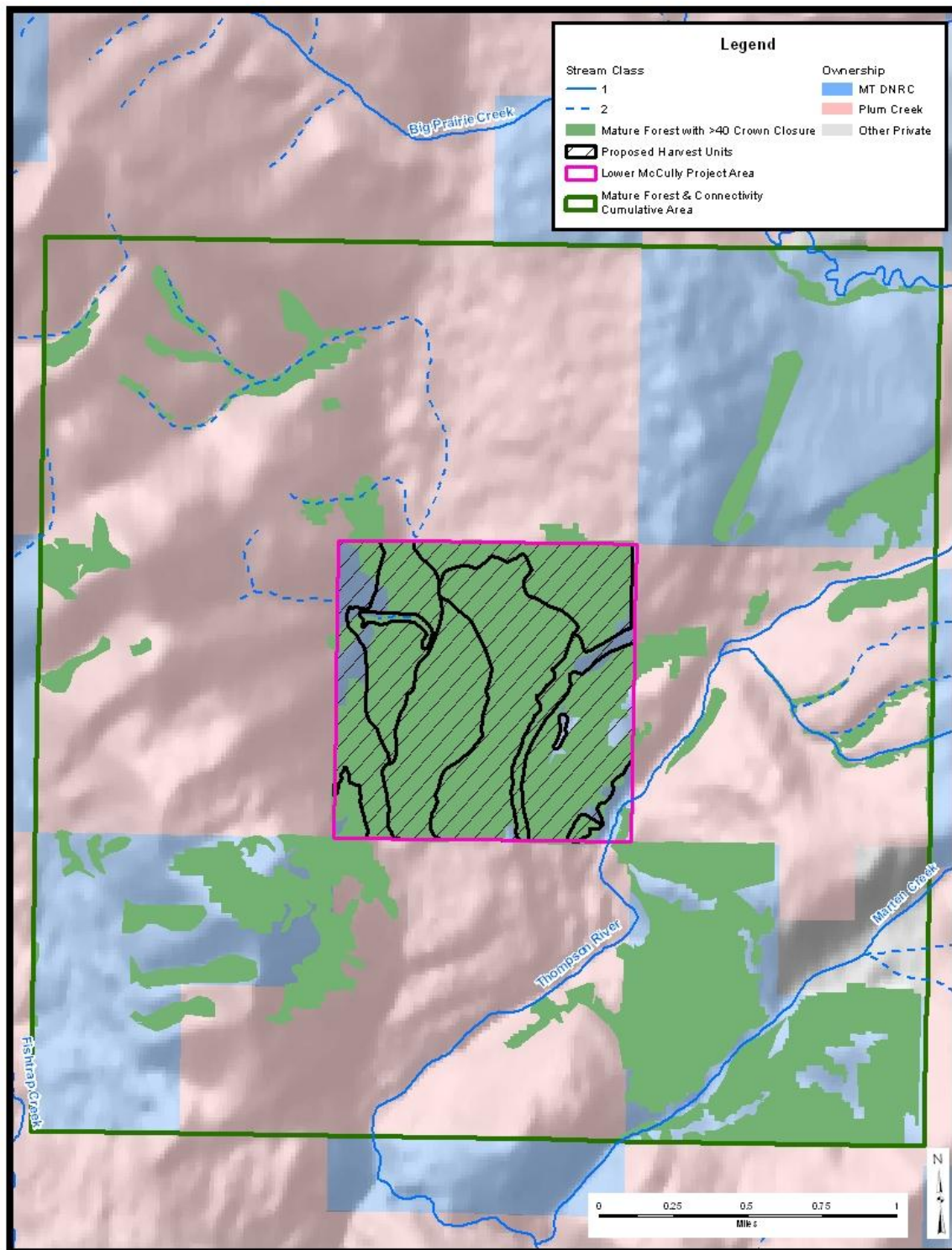


FIGURE W-2 – MATURE FORESTED HABITAT AND LANDSCAPE CONNECTIVITY. Relationship of the project area and proposed units to mature forested stands and potential connectivity for the DNRC Lower McCully Timber Sale.



Attachment III

Harvest Prescriptions

Footnote: All proposed road miles, harvest boundaries and acreages are close approximations as this proposal has not yet been implemented on the ground.

Harvest Unit Prescriptions; Lower McCully Timber Sale; T23N R27W S14

Harvest Unit: T_14-1	Elevation: 3000' – 3120'	Slope: 2 - 40%
Acres: 100	Location: SE 1/4	Aspect(s): Southeast - Flat
Habitat type(s):	PSME/VACA ABGR/LIBO	64 acres 36 acres
Current Cover Type(s):	Ponderosa Pine Mixed Conifer Douglas Fir	52 acres 33 acres 15 acres
Desired Future Condition(s):	Ponderosa Pine Douglas Fir	52 acres 48 acres
Soil Type(s):	Courville gravelly ashy silt loam, 2 to 8 percent slopes	61%
	Half Moon silt loam, cool, 2 to 8 percent slopes	25%
	Yourame gravelly loam, 15 to 30 percent slopes	8%
	Totelake gravelly loam, 8 to 15 percent slopes	4%
	Winkler, cool-Rock outcrop-Sharrott, cool complex, 8 to 40 percent slopes	2%

Current Stand Conditions:		Saw timber; Medium stocked		
Harvest Unit: T_14-1	Multi-storied (three or more canopy levels)			
	Upper Canopy %	Middle Canopy %	Lower Canopy %	
1 st spp	DF = 60-69	DF = 70-79	DF = 70-79	
2 nd spp	WL = 20-29	LP = 20-29	LP = 20-29	
3 rd spp	PP = 10-19	PP = 0-5	PP = 0-5	
4 th spp	LP = 0-5	GF = 0-5	GF = 0-5	
Ave DBH	19"	7"	1.5"	
Height	90'	50'	13'	
Age	150	60	20	
Vigor	Below ave to Poor	Below ave to Poor	Below ave to Poor	

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of ponderosa pine and Douglas-fir.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine and Douglas-fir.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, Douglas-fir, western larch that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:**Lower McCully; T_14-1**

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: T_14-2	Elevation: 3160' – 3200'	Slope: 2 - 15%
Acres: 79	Location: N 1/2	Aspect(s): South - Flat
Habitat type(s):	ABGR/LIBO	79 acres
Current Cover Type(s):	Western Larch/Douglas fir Douglas Fir	77 acres 2 acres
Desired Future Condition(s):	Ponderosa Pine Douglas Fir	77 acres 2 acres
Soil Type(s):	Half Moon silt loam, cool, 8 to 15 percent slopes	68%
	Half Moon silt loam, cool, 2 to 8 percent slopes	32%

Current Stand Conditions:		Saw timber; Medium stocked		
Harvest Unit: T_14-2	Multi-storied (three or more canopy levels)			
	Upper Canopy %	Middle Canopy %	Lower Canopy %	
1 st spp	DF = 60-69	DF = 50-59	GF = 50-59	
2 nd spp	WL = 30-39	WL = 20-29	DF = 40-49	
3 rd spp	GF = 0-5	GF = 10-19	LP = 0-5	
4 th spp	LP = 0-5	LP = 10-19		
Ave DBH	15"	8"	2"	
Height	80'	55'	15'	
Age	110	70	20	
Vigor	Below ave to Poor	Good - Ave	Below ave to Poor	

Treatment Objectives:**Lower McCully; T_14-2**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of western larch and Douglas-fir.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and Douglas-fir.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate western larch, Douglas-fir, ponderosa pine, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: T_14-3	Elevation: 3080' – 3200'	Slope: 2 - 30%
Acres: 147	Location: Center 1/2	Aspect(s): South - Flat
Habitat type(s):	ABGR/LIBO	147 acres
Current Cover Type(s):	Western Larch/Douglas fir	147 acres
Desired Future Condition(s):	Ponderosa Pine Western Larch/Douglas fir	134 acres 13 acres
Soil Type(s):	Half Moon silt loam, cool, 8 to 15 percent slopes	95%
	Yourame gravelly loam, 15 to 30 percent slopes	4%
	Totelake gravelly loam, 2 to 8 percent slopes	1%

Current Stand Conditions:	Saw timber; Medium stocked		
Harvest Unit: T_14-3	Multi-storied (three or more canopy levels)		
	Upper Canopy %	Middle Canopy %	Lower Canopy %
1 st spp	DF = 50-59	DF = 60-69	DF = 60-69
2 nd spp	WL = 30-39	WL = 20-29	GF = 20-29
3 rd spp	PP = 10-19	PP = 10-19	LP = 10-19
4 th spp	LP = 0-5	LP = 10-19	PP = 0-5
Ave DBH	15"	8"	2"
Height	80'	66'	15'
Age	115	175	20
Vigor	Below ave to Poor	Good - Ave	Below ave to Poor

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of western larch.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine and western larch.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, western larch, Douglas-fir, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:**Lower McCully; T_14-3**

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: T_14-4	Elevation: 3120' – 3200'	Slope: 8 - 15%
Acres: 102	Location: West 1/2	Aspect(s): South - Flat
Habitat type(s):	ABGR/LIBO	102 acres
Current Cover Type(s):	Western Larch/Douglas fir Mixed Conifer	86 acres 16 acres
Desired Future Condition(s):	Western Larch/Douglas fir Lodgepole Pine	86 acres 16 acres
Soil Type(s):	Half Moon silt loam, cool, 8 to 15 percent slopes	100%

Current Stand Conditions:		Saw timber; Medium stocked		
Harvest Unit: T_14-4	Multi-storied (three or more canopy levels)			
	Upper Canopy %	Middle Canopy %	Lower Canopy %	
1 st spp	WL = 50-59	DF = 70-79	DF = 60-69	
2 nd spp	DF = 40-49	LP = 10-19	GF = 20-29	
3 rd spp	LP = 10-19	WL = 0-5	LP = 10-19	
4 th spp	GF = 0-5	GF = 0-5	ES = 0-5	
Ave DBH	15"	8"	2"	
Height	80'	60'	15'	
Age	130	80	20	
Vigor	Good - Ave	Good - Ave	Below Ave - Poor	

Treatment Objectives:**Lower McCully; T_14-4**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of western larch.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and lodgepole pine.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate western larch, ponderosa pine, Douglas-fir, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: T_14-5	Elevation: 3160' – 3360'	Slope: 8 - 45%
Acres: 74	Location: West 1/2	Aspect(s): East
Habitat type(s):	ABGR/LIBO PSME/ARUV	58 acres 16 acres
Current Cover Type(s):	Mixed Conifer Ponderosa Pine Western Larch/Douglas fir	53 acres 16 acres 5 acres
Desired Future Condition(s):	Lodgepole Pine Ponderosa Pine	53 acres 21 acres
Soil Type(s):	Half Moon silt loam, cool, 8 to 15 percent slopes	80%
	Winkler gravelly sandy loam, cool, 35 to 60 percent slopes	6%
	Mitten-Tevis complex, 35 to 60 percent slopes	5%
	Tevis gravelly loam, 15 to 35 percent slopes	5%
	Tevis gravelly loam, dry, 35 to 60 percent slopes	4%

Current Stand Conditions:		Saw timber; Medium stocked		
Harvest Unit: T_14-5	Multi-storied (three or more canopy levels)			
	Upper Canopy %	Middle Canopy %	Lower Canopy %	
1 st spp	DF = 50-59	LP = 60-69	GF = 60-69	
2 nd spp	LP = 20-29	DF = 30-39	DF = 30-39	
3 rd spp	WL = 10-19	GF = 0-5	LP = 0-5	
4 th spp	GF = 10-19	PP = 0-5	ES = 0-5	
Ave DBH	17"	9"	2"	
Height	90'	60'	15'	
Age	125	75	20	
Vigor	Good - Ave	Good - Ave	Good - Ave	

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of western larch.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly lodgepole pine and ponderosa pine.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, western larch, Douglas-fir, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:**Lower McCully; T_14-5**

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: T_14-6		Elevation: 3120' – 3640'	Slope: 8 - 45%
Acres: 72		Location: West 1/4	Aspect(s): East
Habitat type(s):		PSME/ARUV ABGR/LIBO PSME/PHMA	34 acres 32 acres 6 acres
Current Cover Type(s):		Ponderosa Pine Mixed Conifer Western Larch/Douglas fir Douglas fir	36 acres 24 acres 6 acres 6 acres
Desired Future Condition(s):		Ponderosa Pine Lodgepole Pine	48 acres 24 acres
Soil Type(s):	Tevis gravelly loam, 35 to 60 percent slopes		46%
	Half Moon silt loam, cool, 8 to 15 percent slopes		15%
	Mitten-Tevis complex, 35 to 60 percent slopes		11%
	Winkler gravelly sandy loam, cool, 35 to 60 percent slopes		11%
	Tevis gravelly loam, 15 to 35 percent slopes		8%
	Mitten-Tevis complex, 35 to 60 percent slopes		7%
	Tevis gravelly loam, dry, 15 to 35 percent slopes		2%

Current Stand Conditions:		Saw timber; Medium stocked		
Harvest Unit: T_14-6	Multi-storied (three or more canopy levels)			
	Upper Canopy %	Middle Canopy %	Lower Canopy %	
1 st spp	PP = 60-69	DF = 70-79	DF = 70-79	
2 nd spp	DF = 20-29	LP = 10-19	GF = 10-19	
3 rd spp	WL = 10-19	PP = 0-5	LP = 10-19	
4 th spp	GF = 0-5	GF = 0-5	ES = 0-5	
Ave DBH	17"	8"	2"	
Height	90'	55'	16'	
Age	135	75	20	
Vigor	Below ave to Poor	Good - Ave	Good - Ave	

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of western larch.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly lodgepole pine and ponderosa pine.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, western larch, Douglas-fir, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.
-

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Ponderosa pine and western larch marked to cut; Leave tree mark all other species.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:**Lower McCully; T_14-6**

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: C_14-7	Elevation: 2960' – 3000'	Slope: 8 - 45%
Acres: 4	Location: SE 1/4 SE 1/4	Aspect(s): Southeast
Habitat type(s):	PSME/VACA	4 acres
Current Cover Type(s):	Ponderosa Pine	4 acres
Desired Future Condition(s):	Ponderosa Pine	4 acres
Soil Type(s):	Totelake gravelly loam, 8 to 15 percent slopes	49%
	Winkler, cool-Rock outcrop-Sharrott, cool complex, 8 to 40 percent	35%
	Half Moon silt loam, cool, 8 to 15 percent slopes	16%

Current Stand Conditions:		Saw timber; Medium stocked	
Harvest Unit: C_14-7	Multi-storied (three or more canopy levels)		
	Upper Canopy %	Middle Canopy %	Lower Canopy %
1 st spp	DF = 70-79	DF = 70-79	DF = 90-99
2 nd spp	PP = 20-29	LP = 20-29	LP = 10-19
3 rd spp	WL = 0-5	PP = 0-5	PP = 0-5
4 th spp		GF = 0-5	
Ave DBH	20"	8"	2"
Height	95'	55'	12'
Age	150	80	20
Vigor	Below ave to Poor	Below ave to Poor	Below ave to Poor

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of ponderosa pine.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine.

Prescribed Treatment:**Lower McCully; C_14-7**

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, western larch, Douglas-fir, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Cable skidding operations are applicable to this unit; hand falling required.
- Trees marked to leave. Tree length skidding and or skidding of tops.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Harvest Unit: C_14-8		Elevation: 3040' – 3160'	Slope: 8 - 45%
Acres: 26		Location: SE 1/4	Aspect(s): East-Southeast
Habitat type(s):		ABGR/LIBO PSME/VACA	16 acres 10 acres
Current Cover Type(s):		Western Larch/Douglas fir Douglas fir	16 acres 10 acres
Desired Future Condition(s):		Ponderosa Pine Douglas fir	16 acres 10 acres
Soil Type(s):	Yourame gravelly loam, 15 to 30 percent slopes		79%
	Half Moon silt loam, cool, 8 to 15 percent slopes		19%
	Courville gravelly ashy silt loam, 2 to 8 percent slopes		2%

Current Stand Conditions:		Saw timber; Medium stocked	
Harvest Unit: C_14-8	Multi-storied (three or more canopy levels)		
	Upper Canopy %	Middle Canopy %	Lower Canopy %
1 st spp	DF = 70-79	DF = 70-79	DF = 70-79
2 nd spp	WL = 10-19	WL = 10-19	GF = 10-19
3 rd spp	PP = 10-19	GF = 0-5	WL = 0-5
4 th spp	GF = 0-5	LP = 0-5	
Ave DBH	16.5"	8.5"	2"
Height	85'	55'	15'
Age	130	75	20
Vigor	Below ave to Poor	Good to Ave	Good to Ave

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Move this unit toward the desired future condition classifications of ponderosa pine Douglas-fir.
- Retention and spacing of the desirable species of the dominant, intermediate and sapling sized timber.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine, Douglas-fir.

Prescribed Treatment:

- Shelterwood with reserves. Leave healthy vigorous trees with good crown and bark characteristics, variable spacing of 70 - 55 feet, leaving 10 - 20 merchantable trees per acre, with some sub-merchantable tree retention.
- Favor leaving dominant, co-dominant and robust intermediate ponderosa pine, Douglas-fir, western larch, that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Cable skidding operations are applicable to this unit; hand falling required.
- Trees marked to leave. Tree length skidding and or skidding of tops.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual sub-merchantable material would be thinned, slashed piled and burned.

Site Preparation and Regeneration:

- Thinning of the desirable undamaged regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Attachment IV

Mitigations Measures

Roads: A transportation system minimizing road miles meeting Best Management Practices (BMP's) has been designed by the DNRC. This system proposes the construction of approximately 0.31 miles of new road would be constructed, 4.58 miles of existing road would be reconstructed, 0.21 miles of temporary road would be constructed, 0.75 miles of existing road would be abandoned, 0.24 miles of abandoned roads would be obliterated. After harvest activities have been completed the roads would be grass seeded and fertilized. Upon completion of roadwork, all haul roads would meet BMP's standards.

Wildlife: the following issues have been identified, with mitigation measures incorporated into the proposed project.

Cease all operations if a threatened or endangered species is encountered. Consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435).

Favor ponderosa pine, western larch and Douglas-fir in retention and regeneration decisions for pileated woodpecker and flammulated owl nesting and foraging habitats. Manage for snags, snag recruits, and coarse woody debris according to (ARM 36.11.411 and ARM 26.11.414)

Manage for snags (minimum of 2 snags/acre > 14 in. dbh; > 21 in. dbh where they exist), snag recruits (minimum of 2 recruits/acre > 14 in. dbh; > 21 in. dbh where they exist), and coarse woody debris (5-10 tons/acre), particularly favoring western larch and ponderosa pine (ARM 36.11.439(1) (b)).

Effectively close new and temporary roads after the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.

Reduce views into harvest units along the open road where feasible using a combination of topography, group retention, roadside vegetation buffers, and retention of pockets of advanced regeneration.

Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads (ARM 36.11.432(1) (m)).

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

On ground skidding units, the contractor and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.

Tractor skidding should be limited to slopes less than 45% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 45%.

Keep skid trails to 20% or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrent with operations.

Limit soil displacement during harvest operations. Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration.

Slash Disposal: No dozer piling on slopes over 35%; no excavator piling on slopes over 45% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

Retain 10 to 15 tons large woody debris and a majority of all fine litter feasible following harvest.

Hydrology: All timber harvest would be regulated by the SMZ law and prohibit equipment operation within any SMZ. In addition to the resource protection provided by the SMZ law, forestry BMP's would be implemented in all aspects of the proposed timber harvest.

Weed Management: Measures to control the introduction or increases to infestations of noxious weeds would be implemented through the Timber Sale Contract. Control measures include the washing of all equipment prior to entering the project area and seeding all areas of disturbed soil associated with road construction or upgrades. Roads and skid trail approaches would again be seeded at the close of project activity. Measures to control any unforeseen outbreak would be implemented as needed through and beyond the project operational period.

Visual Impacts/Aesthetic Values: Prescriptions are designed to mimic historical stand conditions. Harvest unit shapes and residual tree retention patches would follow topographical features such as natural contour breaks and riparian retention zones. The cumulative visual effects of this proposed action in conjunction with current adjacent land management practices would blend into the landscape and soften any hard ownership boundaries.

Fuel Hazards: Harvest treatments would reduce ladder fuels and trees susceptible to fire. Slash would be treated either through logging system design, excavator piling and the burning of these piles, as designated by prescription per each individual harvest unit.

Stand Growth and Vigor: Silvicultural prescriptions are designed to maintain and improve stand growth and vigor, while maintaining DNRC's commitments to managing for a biologically diverse landscape.

Attachment V

Consultants & References

INDIVIDUALS CONSULTED

Kyle Johnson; MT DNRC, Management Forester, Plains Unit

Dave Olsen; MT DNRC, Unit Manager, Plains Unit

Doug Shaner; retired USFS Forester, Express Services, Plains, Montana

Marc Vessar; MT DNRC, Hydrologist/Resource Analyst, Northwestern Land Office

Everett Young; MT DNRC, Service Forester, Plains Unit

Document Preparation

Dale Peters; MT DNRC, Management Forester, Plains Unit

Christopher Forristal; MT DNRC, Wildlife Biologist, Northwestern Land Office

Marc Vessar; MT DNRC, Hydrologist/Resource Analyst, Northwestern Land Office

REFERENCES

- Forestry Best Management Practices
- DNRC, 1996, State Forest Land Management Plan. Montana DNRC Forest Management Bureau. Missoula, Montana.
- Green, P. J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-Growth forest types of the Northern Region. USDA Forest Service, Northern Region. Missoula, Montana.
- Losensky, J. 1997. Historical Vegetation of Montana. Contact #970900. Montana DNRC. Missoula, MT. 109pp.